A CHILTON PUBLICATION

the Iron Age

THE NATIONAL METALWORKING WEEKLY

June 28, 1951

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INTEGRATED PROCESS CONTROL assures quality of

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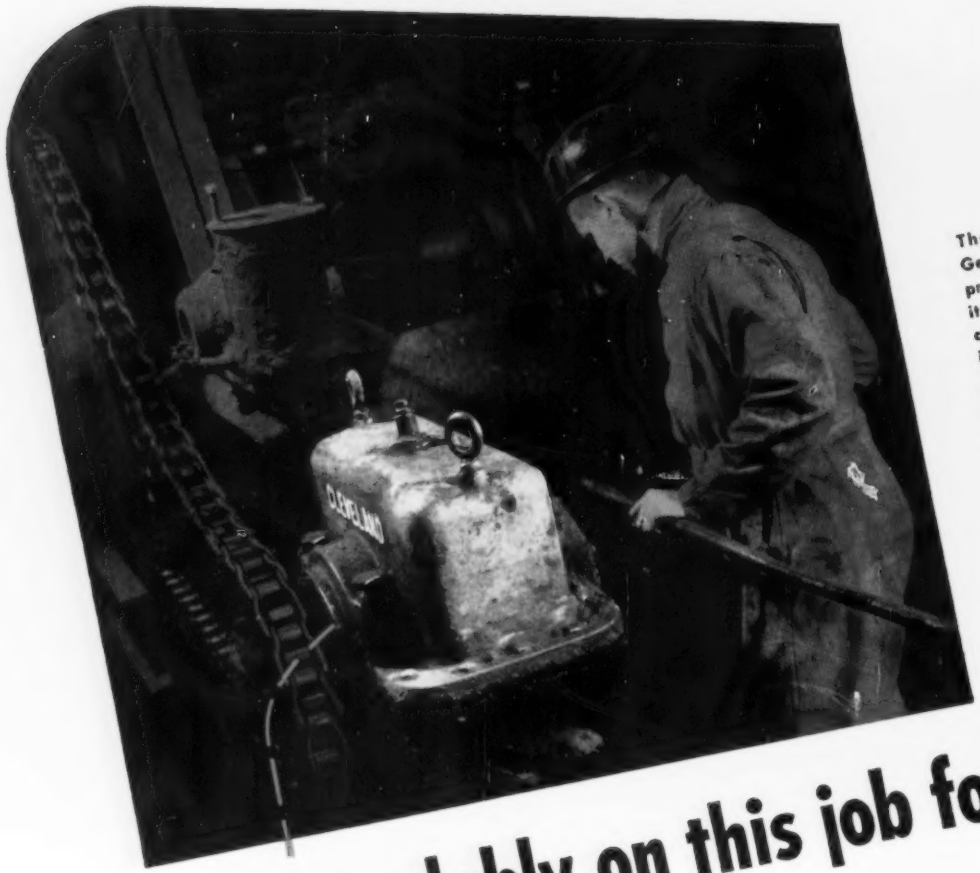
THE OHIO STEEL FOUNDRY CO. LIMA, OHIO

PLANTS AT LIMA AND SPRINGFIELD, OHIO



There are Cleveland Worm Gear Speed Reducers of the proper type, size and capacity to handle any job for which a powerful right-angle drive is wanted.

Photo by courtesy of the North American Coal Corporation, Cleveland, Ohio.

Serving dependably on this job for 13 years

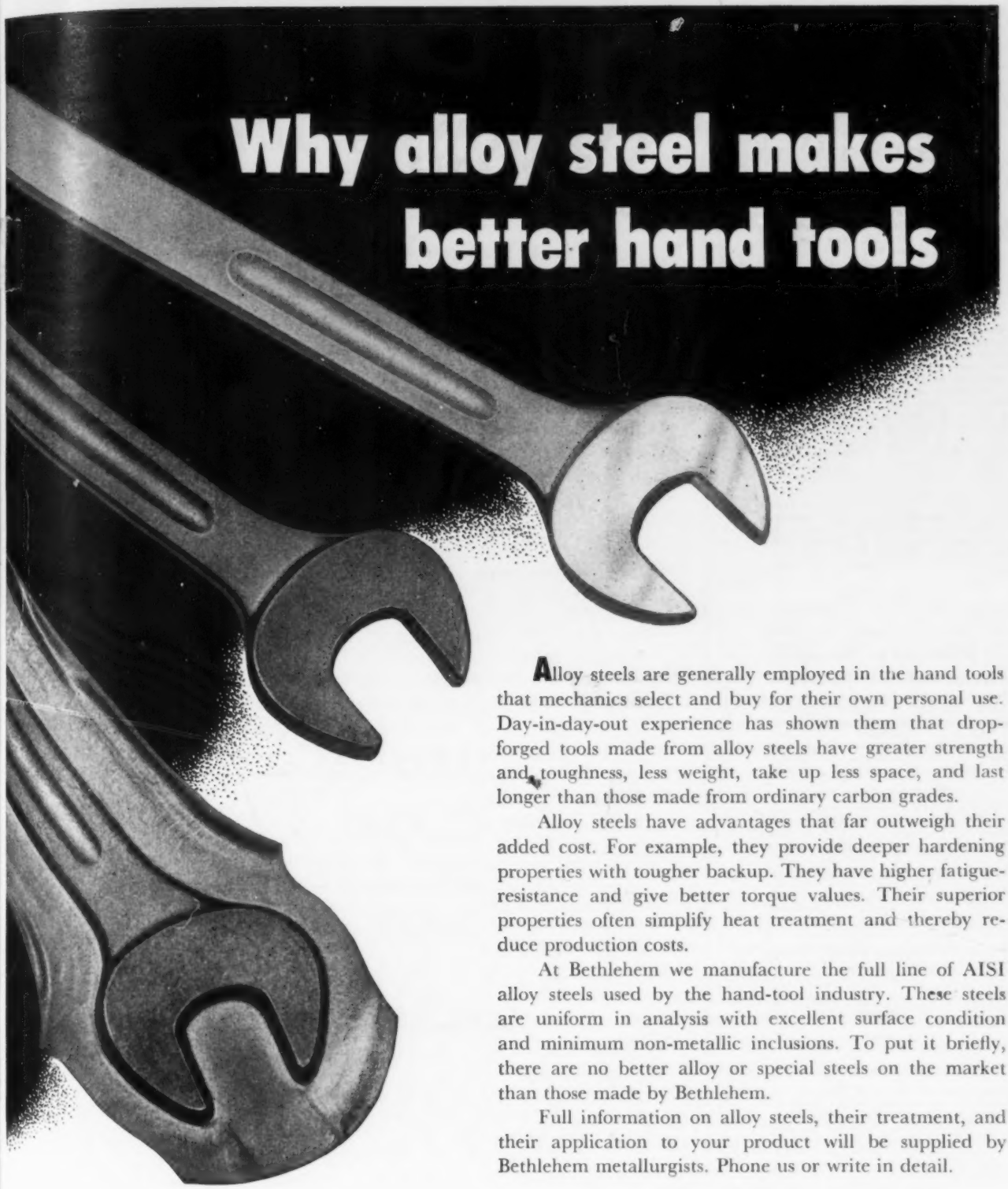
THIS Cleveland speed reducer drives two drag conveyors —one bringing coal to a battery of vibrating screens, the other taking the cleaned coal away from them. The drive has been in continuous service since 1938, in the modern processing plant of the Powhatan Mining Company, first and largest of its type in the state of Ohio.

Cleveland Worm Gear Speed Reducers have been serving the coal industry for more than a quarter century, operating shuttle cars, conveyors, hoists, feeders, picking tables, separators, elevators, jigs, shakers, dryers, loaders and other equipment—wherever a powerful, trouble-free, right-angle drive is desired. Wherever they serve, coal men know from experience that they can always depend on Clevelands for satisfactory, continuous service, no matter how severe the conditions.

Write for the new Cleveland catalog. The Cleveland Worm and Gear Company, 3252 East 80th St., Cleveland 4, Ohio.

Affiliate: The Farval Corporation, Centralized Systems of Lubrication. In Canada: Peacock Brothers Limited.

CLEVELAND
Worm Gear
Speed Reducers



Why alloy steel makes better hand tools

Alloy steels are generally employed in the hand tools that mechanics select and buy for their own personal use. Day-in-day-out experience has shown them that drop-forged tools made from alloy steels have greater strength and toughness, less weight, take up less space, and last longer than those made from ordinary carbon grades.

Alloy steels have advantages that far outweigh their added cost. For example, they provide deeper hardening properties with tougher backup. They have higher fatigue-resistance and give better torque values. Their superior properties often simplify heat treatment and thereby reduce production costs.

At Bethlehem we manufacture the full line of AISI alloy steels used by the hand-tool industry. These steels are uniform in analysis with excellent surface condition and minimum non-metallic inclusions. To put it briefly, there are no better alloy or special steels on the market than those made by Bethlehem.

Full information on alloy steels, their treatment, and their application to your product will be supplied by Bethlehem metallurgists. Phone us or write in detail.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

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BETHLEHEM ALLOY STEELS

BETHLEHEM STEEL

JUNE 28, 1951

IRON AGE

VOL. 167 NO. 26

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Editorial, Advertising and Circulation Offices, 100 E. 42nd St., New York 17, N. Y.

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IRON AGE *summary*

iron and steel industry trends

Scrap, transportation and fuel may hurt steel production this winter . . . Conversion market a paradox . . . DO tonnage swamps mills.

Winter Supply Problem—Steel producers are already worrying about potential threats to production during the coming winter. They are concerned about the availability of two vital raw materials—scrap and fuel. Another worry is transportation. A shortage of either would pose a serious threat to production.

The most real threat is scrap. If production is to keep pace with expanding ingot capacity, the industry this year will need approximately 22 million gross tons of purchased scrap—2 million tons more than was consumed last year. Industry ingot capacity by year-end is expected to be about 110 million tons, an increase of more than 5 million tons over capacity at last Jan. 1.

Scrap Supply Is Low—Normally, steel plants would be building up inventories now. Instead stockpiles have been dwindling to the point where inventories are as low as several days' supply. Some production has already been lost due to actual lack of scrap or poor quality scrap. The question most frequently asked is this: If we can barely keep pace now when scrap can move freely, what will happen this winter when weather normally slows scrap movements?

Coming: A Car Shortage—A freight car shortage is due to hit within a month. The Defense Transportation Administration predicts a daily shortage of up to 50,000 cars for an indefinite period beginning with start of the wheat crop movements in the next several weeks. This may not hurt steel immediately, but the outlook is not encouraging. Despite the freight car building program, there are fewer cars available today than at this time a year ago, although today's fleet is in better condition than was the case last year.

Fuel: Perennial Problem—In recent years, fuel to fire furnaces has been a perennial winter problem for steel producers due to shortages of natural gas in periods of extreme cold. There is no reason to believe that this year will be an exception. Most companies who normally use gas have made arrangements to switch to standby fuels in emergencies, but this has not always proved satisfactory. Some production is usually lost.

Conversion a Paradox—The conversion market is a paradox. While some consumers report a steady decrease in tonnage available from conversion sources, others are reluctant to continue paying the premium prices required. Automotive buyers are more inclined to dicker on prices. One reason for the apathy seems to be the belief of some consumers that the Controlled Materials Plan will get them the steel they need at normal mill prices. When they learn otherwise, the conversion market will once more perk up.

DO Orders Heavy—Meanwhile, some mills are loaded to the saturation point with DO tonnage for the third quarter. The critical items are plates, bars and structurals. The situation has reached the point where a Midwestern mill recently was forced to ask Washington which DO orders to drop to make room for an increase in the DO percentage on sheared and universal plates to accommodate maritime repairs and building of railroad tank cars. A tank fabricator accepted the offer of one steel producer to ship plates from a distant point, with the fabricator paying the additional freight.

Steel warehouses report that demand, while not as hectic as it was 60 days ago, is still strong. They are trying to get their percentage raised from 85 to 100 pct of their base period. Inventories are down to as low as 26 pct of normal. One large warehouse is completely out of plate.

The steel ingot rate this week was estimated at 103 pct of capacity, down one-half a point from last week.

(Nonferrous summary, p. 120)

IRON AGE *introduces*

John Thomas, appointed vice-president in charge of product engineering for the AMERICAN LOCOMOTIVE CO., New York.

Thomas G. Simison, appointed division superintendent of rolling mills making tinplate and flat-rolled products at KAISER STEEL CORP., Fontana, Calif. **Dale Miller, Harry Reading** and **Walter Dettman**, named assistant superintendents, and **Roger Barnes**, made general foreman of the tinplate mill.

Orville L. Longbrake, appointed defense regulations engineer for the AMERICAN STEEL & WIRE CO., Cleveland.

Eugene M. Lang, elected vice-president in charge of manufacturing of the HELI-COIL CORP., Long Island City, N. Y. **Louis K. Rimer**, becomes works manager and assistant secretary.

George B. Foote, elected vice-president and treasurer of the CONTROL ENGINEERING CORP., Canton, Mass. **Arthur E. Hamm**, made assistant to Mr. Foote.

Earl T. McKinney, appointed factory superintendent of A. Y. McDONALD MFG. CO., Dubuque, Iowa.

A. E. Buchanan, made sales representative in the south for Federated Metals Div. of AMERICAN SMELTING & REFINING CO., New York.

Lloyd F. Giegel, appointed branch manager of the Gary sales office of RELIANCE ELECTRIC & ENGINEERING CO., Cleveland, succeeding R. Magnetti, who resigned to enter the electrical construction industry. **Daniel J. Donnelly**, added to the Philadelphia office in a sales engineering capacity.

G. H. Schneider, becomes assistant sales manager of the Sheets and Roofing Products Sales Div. of INLAND STEEL PRODUCTS CO., Milwaukee. **D. L. Rossiter**, made manager and **A. T. Krueger** and **W. G. Baum**, named assistant managers of the Metal Lath Products Sales Div. **B. B. Barker**, appointed manager of the Consumer Products Sales Div. in Milwaukee. **M. P. Komar**, made manager of the Chicago branch. **G. F. Gruenert**, named manager of the Cleveland plant. **Arthur F. Pope**, appointed manager of the Rochester-Buffalo branch.

I. W. Ferguson, made manager, quality control of the COOPER-BESSEMER CORP., Mt. Vernon, Ohio. **E. C. Phelps**, made assistant works manager; **Harold Johnson**, factory superintendent; and **Harry Ceccsarini**, supervisor of the Routing and Estimating Dept.

George C. Rodgers, named manager of the Military Sales Dept. of the Herman Nelson Div., Moline, Ill., and **Irving W. Clark**, made manager of the Military and Special Contracts Dept., Louisville, of the AMERICAN AIR FILTER CO., Louisville.

Charles A. Mapp, appointed Chicago district manager of locomotive sales for FAIRBANKS, MORSE & CO., Chicago.

Harold R. Berkal, appointed wire and cable specialist for Construction Materials Dept.'s central district of the GENERAL ELECTRIC CO., Schenectady. **Robert D. Buzzee**, named buyer for the plastics division.

James A. Fritts, appointed vice-president and works manager of PAUL & BEEKMAN, INC., Philadelphia.

E. J. CULLEN, named head of Sheet Metal Products Sales Div. of Inland Steel Products Co., Milwaukee.

WILLIAM S. RENIER, appointed director of engineering of the Hydraulic Press Mfg. Co., Mt. Gilead, Ohio.

ERNEST R. JACOBSEN, elected vice-president in charge of sales for Paul & Beekman, Inc., Philadelphia.

IRON AGE

salutes

Kenneth D. Mann

"KEN" MANN is a one-man cheering section for Firth Sterling Steel & Carbide Corp. His enthusiasm is contagious, has done wonders for the morale of Firth Sterling people—from the top brass on down. He has everybody thinking in terms of Firth Sterling "firsts" and how to add to the list.

The 47-year-old chairman and president took over at Firth Sterling in June 1949. Last year the company earned more than $800,000—a $1.7 million improvement over 1949. An expansion and improvement program is well under way. More will come.

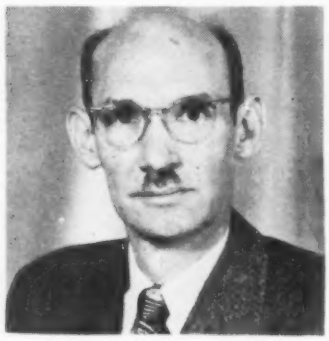
Ken can't tolerate defensive thinking. Nobody thinks defensively at Firth Sterling today. He demands action—and he gets it. With enthusiasm. He's on the move, and Firth Sterling moves with him.

Ken is looking for new and better ways to do things. Two of his research men have just returned from a study of European methods of producing tungsten carbides. Firth Sterling is pushing development of an electronic method of cutting nonmachinable materials. It is making progress in other fields of research.

Ken grew up in the steel business. His first job was as a laborer in the open-hearth shop of Republic Iron & Steel Co., in 1923. After his graduation from Harvard in 1926 he went back as a second helper. Then he jumped to sales.

When Ken left Republic Steel to enter the Army in 1942 he was executive vice-president of Truscon Steel Co. He established a distinguished war record in Europe, Africa and the Pacific.

A. W. WINSTON appointed assistant manager of Magnesium Dept. of Dow Chemical Co., Midland, Mich.



DANA W. SMITH, appointed associate director of Div. of Metallurgical Research of Kaiser Aluminum & Chemical Corp., Spokane.

JEREMIAH J. BOUGHEY, named director of labor relations of western area for U. S. Steel Co., Chicago.

HENRY W. WINKLER, elected vice-president in charge of research and laboratory control of Brooks Oil Co., Cleveland.

IRON AGE *introduces*

Continued

Dean Walter, appointed West Coast installation engineering coordinator for Aeroproducts Div. of GENERAL MOTORS CORP., Detroit. **Raymond J. Lynch**, promoted to assistant chief engineer; **Wallace F. Dunn**, manager of bearing applications and **Leland D. Cobb** adds production design to his duties in the Engineering Dept. of New Departure Div., **Carl L. Bates**, named assistant manager of the Cincinnati zone of Pontiac Motor Div., succeeding Joseph M. Turley, who resigned to enter private business.

George H. Dowding, promoted to director of labor contract administration in Pittsburgh for U. S. STEEL CO.

Wesley R. Johnson, named market analyst for Shakeproof Inc., a division of ILLINOIS TOOL WORKS, Chicago.

John J. Bricker, appointed director of purchasing for INTERNATIONAL BUSINESS MACHINES CORP., New York.

W. Sanger Green, named assistant to the general manager of KAMAN AIRCRAFT, Hartford. **Ignor B. Bensen**, made chief of research and **William F. O'Neill**, plant protection supervisor.

H. B. Kiphuth, named assistant director of management development for the WESTINGHOUSE ELECTRIC CORP., Pittsburgh.

D. D. Cramer, elected president of the ALUMINUM LADDER CO., Worthington, Pa. **H. J. Mudd** becomes vice-president.

Kenneth MacGrath, elected to the board of directors of LEAR, INC., Grand Rapids.

Rowan F. Crawford, named employment advisor for ARMCO STEEL CORP., Middletown, Ohio.

Alan Irwin, promoted to manager of the Detroit Div. of the GENERAL BOX CO., Chicago.

Joseph A. Rigby, named vice-president in charge of engineering and sales for the BROOKS OIL CO., Cleveland.

Cedric W. Lutz, [illegible] or of purchases for GU[illegible] ORP., Pittsburgh.

Daniel S. Wilkin, [illegible] tor of personnel of [illegible] M ING CO., Cleveland

Edward H. Roper, [illegible] m ager of the Genera[illegible] S Dept. of AIR REDUCTION SAI CO., New York.

W. R. Hall, named Boston dist manager of HOTPOINT INC., Chicago, replacing F. L. Cashman, who resigned. **J. H. Kidd**, becomes zone manager in Dallas; **V. P. Owen**, Philadelphia zone manager; and **L. W. Hitchcock**, Cleveland zone manager.

A. M. Miller, appointed district manager of Detroit sales office of the DURALOY CO., Scottdale, Pa.

Paul E. Rosenbaum, elected Missouri representative for the BILLINGS & SPENCER CO., Hartford.

John C. Harbaugh, named assistant general service manager of the Pontiac Motor Div. of GENERAL MOTORS CORP., Pontiac, Mich.

Edward S. Wotkyns, named a director of the WATERBURY FARREL FOUNDRY & MACHINE CO., Waterbury, Conn.

OBITUARIES

Wilfred C. Owen, 57, president of Detroit Steel Products Co., Detroit.

Walter J. Torbet, 56, district sales manager of the Detroit Steel Products Co., Detroit.

Edward L. Clair, 57, president of the Interlake Iron Corp., Cleveland.

Walter M. Charman, 57, president and founder of the Ferro Engineering Co., Cleveland.

J. Gordon Gage, 64, manager of the Butler Div. of Armco Steel Corp., Middletown, Ohio.

Howard K. Dagnan, 41, assistant industrial engineer at the Fairfield tin mill of Tennessee Coal, Iron & Railroad Co., Birmingham.

Frank S. Schuyler, 66, retired manager of Detroit district office of Allis Chalmers Mfg. Co., Milwaukee.

William T. Harrison, 66, formerly an engineer for the Bos-Hatten Corp., Buffalo.

The use of N-A-X ALLOY STEEL *in Aircraft Gas Turbines saves up to 50 per cent of critical Stainless Steel.*

Conservation is possible – without sacrifice with use of N-A-X ALLOY STEELS

With the demand for greatly increased quantities of the critical and strategic Stainless Steels used in Jet Engines intensified by the acceleration of the building program, the Air Force requested the producers of these engines to seek *suitable* material with less critical alloy content to replace the Stainless Steel for certain moderate temperature application in these aircraft gas turbines.

The steel selected had to be of low-alloy content with high strength and good welding characteristics. Ordinary low carbon steel did not meet the requirements because of its low tensile properties and the fact that it could not be satisfactorily welded by the inert arc process, which is widely used in aircraft gas turbine manufacture.

The data available from tests made on several weldable low-alloy, high-strength steels indicated that N-A-X ALLOY STEEL was the most satisfactory of the group — *its selection followed.* Unlike other possible substitutes, N-A-X ALLOY STEEL has good low temperature impact values, maintains its higher strength and is not subject to temper brittleness in the wide operating temperature range required of the steel for this purpose — from a low of −70°F. to +800°F.

The use of N-A-X ALLOY STEEL for this application has cut the amount of Stainless Steel required in half. This is of considerable importance to the Air Force.

GREAT LAKES STEEL CORPORATION

N-A-X Alloy Division — Ecorse, Detroit 29, Michigan

NATIONAL STEEL CORPORATION

on the assembly line

automotive news and opinions

Auto firms to seek tooling directives . . . Defense tooling is rolling . . . Industry layoffs will hit early in July

by Walter G. Patton

Washington Help—At least two automobile manufacturers plan to seek government directives to insure completion of their present tooling programs for new high compression engines. The move is not surprising. According to informed sources, Washington's opposition to new engine programs is a factor to be reckoned with even though it has not come out into the open.

Defense Tooling High—The volume of defense tooling is increasing steadily. In the case of some producers of standard machines, defense orders now exceed 90 pct of total volume. Similarly, some builders of special machine tools have a high volume of defense business. Other firms which have been particularly active in the new auto engine tooling program have at least 40 pct of their capacity tied up with defense.

The strong trend toward defense is expected to continue well into 1952.

Return to The Scene—John L. Lewis returned to the scene of one of his former labor triumphs last week when he accepted an invitation from Ford Local 600 to address members of the UAW-CIO. Lewis' visit to Detroit revived rumors he would like to push Ford Local 600 into United Mine Workers' District 50. It will be recalled Lewis' signature appeared on the first Ford labor contract.

Officers of the International UAW-CIO refused to attend the meeting. However, anti-Reuther representatives of the Ford Council and members of five General Motors locals from Flint voted to send representatives.

The meeting was sponsored by the president of Local 600, Carl Stellato, currently in disfavor with the UAW-CIO Executive Board. Most observers believed the Stellato move was at least as much anti-Reuther as it was left-wing.

Operating Rate—No. 1 question facing the automobile industry concerns the operating rate during the third period of this year. When NPA controls become effective July 1, the industry's output will be limited to 1,200,000 units. IRON AGE, p. 76, June 14, 1951). Car producers have several choices: (1) reduce operations immediately and then assemble cars at a uniform rate throughout the third quarter; (2) continue at the present rate of operation and then shut down as necessary to keep within government restrictions.

General Motors has chosen the second plan. Its example will undoubtedly be followed by most of the car producers. Among advantages of the periodic shutdown: (1) keeps the working staff intact and (2) is the fairest means yet devised for spreading available work. Despite the critical steel situation, manpower is expected to be the No. 1 Detroit problem if defense production attains a substantial volume. Long layoffs may force auto plant workers to other defense jobs.

Model Steam Hammer—Buick employees paid a fine compliment to Roy I. MacArthur, superintendent of the Drop Forge Plant, recently when he was promoted to general superintendent of aircraft production.

Fellow employees presented MacArthur with a scale model of a steam hammer which is an exact replica of a 25,000-lb forging hammer. The model is built to a scale of 12 to 1. It stands 16 in. high.

The principle castings are made of aluminum. All working parts are chrome plated. Even the tiny die block is built exactly to scale, and is an exact miniature of a forging die used to produce blades for jet engines.

Japanese Henry J—Kaiser-Frazer is moving ahead with its car expansion program in foreign countries despite the uncertainties

assembly line

Continued

of today's market. Recently, Japanese workers produced a 1951 Henry J—the first American automobile built in Japan since Pearl Harbor.

East Japan Kaiser-Frazer Ltd. occupies manufacturing facilities made available by dismemberment of the Mitsubishi industrial empire. Estimated production is about 500 units per year. Components are shipped from Willow Run and assembled by Japanese engineers who were trained at Willow Run.

K-F is moving ahead rapidly with plans to produce aircraft. The first plane subassembly is scheduled for this month. A large part of the Willow Run plant has been cleared for defense. Completed planes are probably at least 6 months away. Nationally known banks have loaned K-F $25 million to be used for defense contracts.

Sheet Source — Reports that GM plans to assist Algoma Steel Corp. Ltd. in financing a rolling mill at its Sault Ste. Marie, Ont. plant, are neither confirmed or denied. If true, this will assure GM a source of sheet steel for its expanding Diesel locomotive operations at London, Ont. and for the other automotive and accessory manufacturing operations throughout Canada. Prior to an export ban by the Canadian Government, GM was buying a substantial tonnage from Algoma.

Sales and Service—Further evidence that the automobile industry is becoming increasingly sales and service-minded was furnished last week by the announcement that International Harvester is sponsoring a free-of-charge inspection for nearly 1 million International Harvester trucks now in service. The offer is good for 90 days starting July 1. Service will be available at the organization's 5000 sales and service outlets throughout the country.

Collectively Bargained — After nearly 4 months of collective bargaining, Kaiser-Frazer and the UAW-CIO have signed an aircraft supplementary contract. The new contract runs concurrently with the 5-year master agreement. It establishes pay rates, job classifications, transfer of machinery from automobile to aircraft, seniority and considers other knotty problems. Supplementing its present automotive employment with anticipated aircraft production is expected eventually to bring K-F employment to nearly 20,000.

The company is presently hiring workers for production of Fairchild C-119 Packets and for later production of Chase C-123's at Willow Run.

Safe Driving — Safety driving rules recommended by Al Esper, supervisor, General Test Section, Vehicles Testing Department of Ford Motor Co. follows: (1) Keep a safe distance behind the car ahead of you on the highway, (2) make sure nothing is coming behind you before alighting from a car, (3) shut off your engine and set the hand brake anytime you leave your car, (4) go slowly into a curve; accelerate only after you have passed the center, (5) when you see someone driving down your lane, sound your horn and flash your lights. Never pull over to the left. If worse comes to worse, "hit the shoulder." Let your clutch alone and use the engine as a brake. Do not try to pull back on the road too quickly.

Litigation—A Justice Dept. suit has been lodged in the Detroit Federal district court against three manufacturers of stamped metal wheels. Charges of "combining and conspiring to restrain and monopolize trade and commerce in the manufacture and sale of stamped metal wheels" are filed against Kelsey-Hayes Wheel Co., Detroit; The Budd Co., Philadelphia; and Motor Wheel Corp., Lansing, Mich.

National Wheel and Rim Assn., has been named as a co-conspirator but not as a defendant.

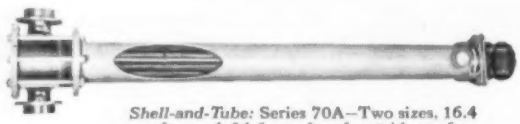
THE BULL OF THE WOODS By J. R. Williams

NOW JUST LOOK SNEAKY AN' LIKE YOU'RE MAKIN' MAPS OF TH' SHOP--THEN RUN WHEN HE COMES TOWARD YOU!
BE SURE AN' DROP THAT NEWS-PAPER PICTURE OF OL' JOE!
THEM SHOP HUMORISTS CAN'T BEAR TO SEE ANYBODY REST--THEY'LL HAVE TH' POOR OLD WATCH-MAN SPENDIN' HIS TIME BETWEEN HIS ROUNDS HUNTIN' REDS!
6-29
J.R.WILLIAMS
THE RED HERRING
COPR. 1951 BY NEA SERVICE, INC. T. M. REG. U. S. PAT. OFF.

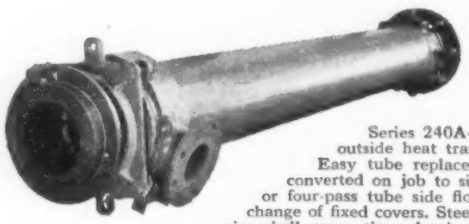
"KARBATE" BRAND IMPERVIOUS GRAPHITE HEAT EXCHANGERS *FOR ALL PURPOSES!*

The "Karbate" impervious graphite heat exchangers illustrated are used extensively as boilers, coolers, condensers, vaporizers, evaporators, heaters and absorbers in handling corrosive chemicals, either hot or cold. They *all* can be had in a complete size range. *All of them* offer the following advantages:

- **Highest heat conductivity rate of the practical corrosion-resistant materials.**
- **Highly resistant to corrosion by acids or alkalis, hot or cold.**
- **Freedom from corrosion scale, as compared to metals.**
- **Immune to thermal shock.**
- **No contamination of product.**
- **Strong and easy to install and maintain.**



Shell-and-Tube: Series 70A—Two sizes, 16.4 sq. ft., and 24.6 sq. ft. of outside surface area respectively. Tubes easily replaced in the field. Interchangeable single and double-pass construction.



Series 240A—70.6 feet of outside heat transfer surface. Easy tube replacement. Easily converted on job to single, double, or four-pass tube side flow by simple change of fixed covers. Steel, shell, oversize shell connections, impingement plates and drain and vent plugs integral with shell end castings. Stainless-steel baffles assembled with steel tie rods to form protective cage for tube bundle. Removable "Karbate" tube bundle. Write for catalog sections for S-6690, S-6715 for details of applications, maintenance, sizes and characteristics of these exchangers.

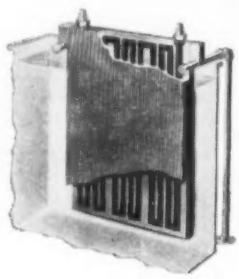
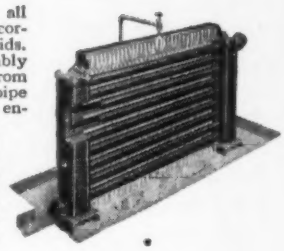
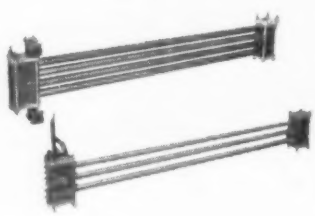


Plate heaters: Used to heat or cool corrosive liquids in tanks and vessels. Compact, completely assembled, easy to put in. Used in pickling, etching, plating and cleaning tanks. Complete size range. Models for horizontal and vertical mounting. Write for catalog section S-6620.

Style FH heat exchangers (Size 1½): Are especially recommended for tanks with solution depths of 16 inches or less. Write for catalog section S-6750.

Cascade coolers: For all cooling jobs involving corrosive gases and liquids. Complete cooler assembly may be made quickly from 4 standard items in 5 pipe sizes. Capacity easily enlarged or reduced by adding or subtracting standard sections. Compact construction to save plant room. No special supporting structure needed. Write for catalog section S-6780.





Concentric Tube exchangers: Available in two types. Series 10A is small, low-priced, gives true counterflow. Exceptionally good for small flow rates at narrow temperature differences . . . Series 20A manufactured with "Karbate" inner and outer piping, and is used to transfer heat between two corrosive fluids. Both have sectional construction, can be added to or subtracted from at will. Sturdy, can be moved from place to place after assembly, adapted to any method of mounting on floor, wall, or ceiling. Write for catalog section S-6670.

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west coast progress report

digest of far west industrial activity

by R.T.Reinhardt

Scrap Is Where You Find It—Thousands of tons of No. 1 and No. 2 steel scrap lie in the agricultural areas of the Pacific Northwest awaiting the Midas touch of dealers eager and anxious to participate in the scrap drive.

A spot check of the areas East of Boise, Ida., reveal tons and tons of steel scrap which should be in western steel furnaces. Owners of automobile wrecking yards continue to insist that ceiling prices for metal are not sufficiently high to stimulate their activity.

Large Hammer—Alcoa, at Los Angeles, is putting in the largest forging hammer west of the Mississippi which will make available pressures up to 25,000 lb per sq in. to West Coast fabricators of aluminum. Incentive for this development is the expanding West Coast aircraft industry.

Alcoa's extrusion press which has been out of production since April is again in operation. A 10-ton tierod was air-freighted from the East as a replacement. This is believed to be one of the largest single units ever shipped by the airlines.

Stamping Prospect—Rumor persists that the Air Force is planning to install somewhere on the West Coast a 50,000-ton press to stamp out large aircraft sections in one operation. One plane part which could be produced in this manner is the center section of wings. Only current limitations on the Air Force budget prevent immediate installation. A request for the project can be expected next year.

Gas Furnaces Operating—First of 12 Reda Gas Furnaces slated for southern California were fired up last week in Los Angeles, apparently with the full approval of the County Air Pollution Committee, to operate without any smog controls. Three Los Angeles operators who pulled first taps from the new units reported "unexpected success" resulting from first shakedown tests. Furnaces are made by Reda Pump Co., of Bartlesville, Okla. All furnaces sold by Reda to operators here have 1000 lb capacity with two heats per hour. Depending on type of scrap, charging time is from five to 10 minutes. Firing time at 2700F is reported 20 to 25 minutes. Unit is stack-charged taking anything up to 12 in. square.

Warehousemen's Woes — Last week Walter S. Doxey, president, American Steel Warehouse Assn., Inc., told southern California warehousemen and mill representatives he considered nationalization of the steel industry just one step away from actuality.

He reported that steel men now have controls on profits and production and would soon have complete controls on distribution. "The one thing lacking in an almost complete governmental, bureaucratic domination of the industry is the one final step of grabbing control of the stock."

Tight Control — According to Mr. Doxey the Controls Material Plan will put "nearly five-sixths of all the steel produced into allotment for military and atomic energy requirements, various defense supporting programs and for component parts of equipment used for these purposes and programs." From the one-sixth "free" steel left over must come the quota of steels available to warehousing operations, he stated.

Southern California warehouses will be particularly hard hit according to Mr. Doxey because the large majority of the numerous small businesses in that area depend upon warehouses for their steel. Historically, western warehouses supply a greater proportion of steel to manufacturing than the national average.

Ore Price Fixed—Utah tax commission has fixed the price of iron ore mined in Utah at $4.53 per net ton, for tax purposes, an increase of almost 300 pct over the $1.55 valuation used last year. The new valuation is based on the price of Mesabi ore less transportation costs to Lake Erie ports.

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Use the heat treatment prescribed for your Latrobe Desegatized Brand steel. Heat treating recommendations are the result of years of research by Latrobe's metallurgists and the experience of Latrobe's customers. Proper heat treatment of Latrobe Desegatized Brand steels will give you tools and dies capable of longer production runs—uninterrupted by failures on the job.

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LATROBE ELECTRIC STEEL COMPANY

LATROBE, PENNSYLVANIA

the federal view

this week in washington

by George H. Baker

CMP Double-Talk—Congress is showing increasing signs of irritation at NPA's conflicting statements as to how much steel—if any—will be available later this year for nondefense production.

Examples of CMP talk leading to Capitol Hill investigation:

"A sufficient amount of controlled materials is expected to be available to support the permitted levels of production of automobiles and consumer durables under open-end CMP during the third quarter.

Change in Thinking—Compare that statement with this:

"From now on, the pinch in our supplies of materials will be felt increasingly."

NPA continues to deny that 100 pct CMP is near at hand, but officials are known to be preparing the requirement forms for all manufacturers of hard goods. Forms are slated to hit the mails as soon as allocations of metals for 40,000 makers of "B" products are made.

Buying Slow-Down? — Claims that large U. S. mining firms with "big foreign interests" are slowing government buying of manganese and other materials now in short supply are being aired by Rep. Engle., D., Calif.

Large companies are opposing subsidies in order to protect their foreign investments, he states, predicting that the government's foreign manganese-buying program will bring in only "wheelbarrow loads" of manganese concentrates.

Engle's claims are challenged by other congressmen, who say that foreign buying policies of the State Dept. are at least partially to blame for the low-gear program.

Loan Shake-Up Due—Basic reorganization of the government's defense loan and amortization program can now be regarded as a certainty.

Ruckus stirred up by the proposed granting of $7.8 million worth of tax benefits to the Hazelton Steel & Tubing Corp. is the key incident in the move ordered personally by Defense Mobilizer Charles E. Wilson.

If present plans go through as scheduled, RFC will play a more prominent role in the loan and tax program. Thus far, RFC's only function in the tax-benefit program has been to carry out Wilson's instructions.

Antimerger Campaign Okayed—Look for a more intensive antimerger campaign to be waged by the Federal Trade Commission during the fiscal year starting July 1.

Despite congressional moves to slash personnel services left and right (vacation time, chauffeurs for officials), both Senate and House okayed an increase of nearly $100,000 for the FTC's antimerger work, bringing the Commission total funds for the year to nearly $40 million.

Although FTC fared better than other agencies in the economy drive at the Capitol, it will receive about $500,000 less than it requested.

Exaggerates Inflation? — Secretary of Defense Marshall reaped a harvest of front-page publicity in daily newspapers recently with his contention that inflation had removed $7 billion from the $35 billion allotted by the military for purchase of hard and soft goods and construction.

But some officials are hard pressed to explain how Marshall arrived at this tremendous figure.

Actually, a substantial portion of the military funds allocation for price increase is not directly related to inflation. Some of the increases in requests for funds can be traced to bookkeeping procedures, design changes, and lack of mass output of new items.

New Salary Policy—Avalanche of applications from business for salary increases is forcing the Salary Stabilization Board to place responsibility for adjustments squarely in the hands of employers.

SSB likens the move to procedures under income-tax laws which place responsibility for determination upon persons filing returns.

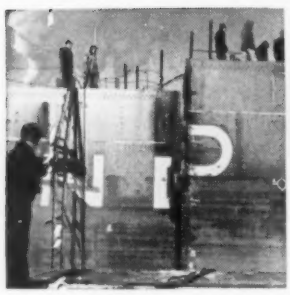
STRETCHING

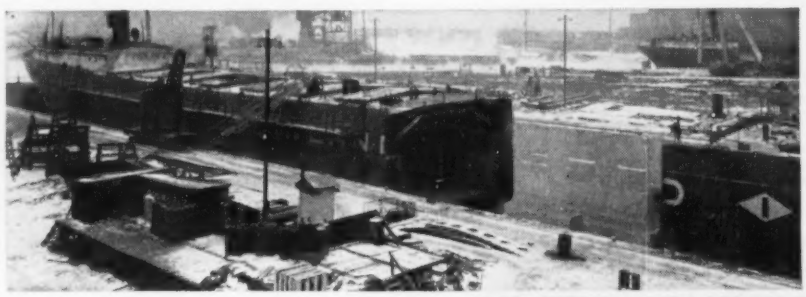
a ship stretches steel supply . . .

Inland boosts ore carrying capacity by adding 72 feet to the *Philip D. Block*

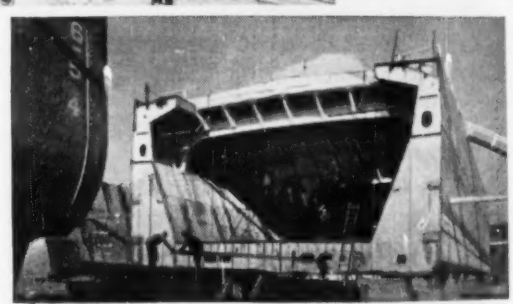
40,000 more tons of much-needed ore is made available to Inland Blast Furnaces each year.

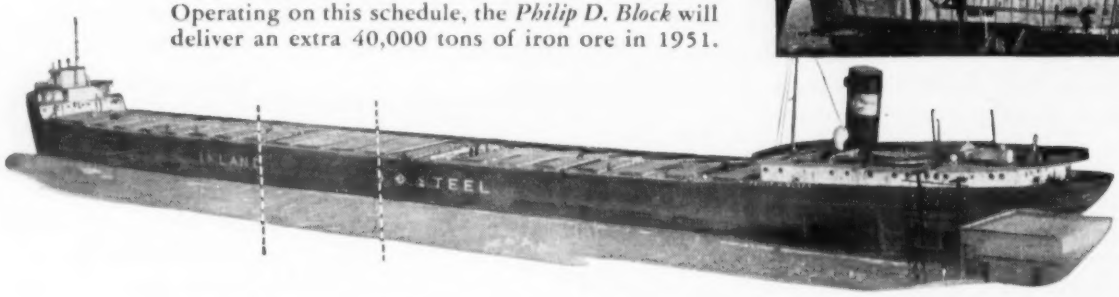
1 A "before" photo of the *Philip D. Block* showing where ship is to be cut in half. This ship, built in 1925 had an overall hull length of 600 ft. Lengthening will bring the *Block* to within 6 ft. of the new *Wilfred Sykes,* Inland's flagship and largest vessel on the Great Lakes.





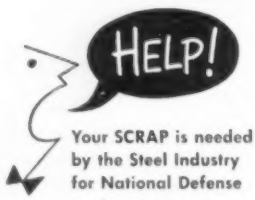
2 Ship has been opened amidships, floated apart and is ready to receive new 72 ft. midsection. Addition of this section will give the ship an average carrying capacity in excess of 14,000 gross tons. Previous average tonnage was 12,800. In a normal lake shipping season, this vessel will make 33 complete round trips between the ore docks at Superior, Wisconsin, and Inland's mill at Indiana Harbor. Operating on this schedule, the *Philip D. Block* will deliver an extra 40,000 tons of iron ore in 1951.





3 New mid-section is in place and reconstruction complete. Total time in drydock: 100 days. The *Philip D. Block* has since joined her four sister ships, and the many other lake ore carriers, in the important task of supplying iron ore to a nation counting more than ever on a big year in steel.

The lengthening of the *Philip D. Block* is just one more step in a continuing modernization and expansion program at Inland.



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INLAND

THE IRON AGE
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TECHNICAL ARTICLES

Temperature and stress rate affect FRACTOLOGY of FERRITIC STAINLESS

By C. A. Zapffe
Consulting Metallurgist
Baltimore
and
C. O. Worden
Horace T. Potts Co.
Philadelphia

Temperature and velocity of fracture are counteracting factors in the fractology of stainless types 430 and 446. Under hammer-blow, these steels show transition to slip type patterns between 35° and 100°. Fracture by rifle shot produces identical patterns except the transition temperature is 150°C higher.

Fractography has been applied to a study of the fracturing of types 430 (17 pct Cr) and 446 (26 pct Cr) ferritic stainless steels over a temperature range from 22° to 475°C, and under the fracture conditions of (a) hammerblow and (b) rifle shot. Prominent changes in pattern are found, particularly when the strong cleavage tendency in the lower temperature range gives way to plastic distorted fractographic fields if the metal is heated above its fractotropic temperature range.

Temperature and rate of stressing are shown to be opposing factors in the balance of plastic and clastic phenomena, the cleavage-type patterns persisting at considerably higher temperatures for fracture by rifle shot. Increasing chromium content acts in the same direction as increasing stress rate. A comparison of the fractographic results with a plot of estimated visual brittleness shows that the appearance of the microfracture changes importantly at temperatures much below those at which the macrofracture visibly changes. Besides illustrating these effects, the fractographs contain numerous markings disclosing further features of the solid state never previously described.

A few preliminary experiments run with the E steel of the earlier ship-plate series[1] and with types 430 and 446 stainless steels were convincing in showing that the effects of temperature, and hence probably also of rate of stressing, are broadly common to both stainless and mild steels. This report will consider only the two grades of ferritic stainless steel shown in Table I. The heat treatments were given to increase grain size. The original material was ¼-in. cold-drawn bar.

Specimens 2 in. in length were cut from the heat-treated bars and were drilled with a ⅛-in. longitudinal hole ½-in. deep, into which a

FIG. 1—Fractograph of type 430 fractured by hammerblow at 22°C, showing typical rectangularity of cubic cleavage in chromiferous ferrite. 550X.

FIG. 2—Fractograph of type 430 fractured by hammerblow at 35°C, showing unchanged rectangularity. Cleavage edge at left identifies this as an 001 face with its rectangularity derived from intersecting 100 cleavages. 435X.

FIG. 3—Type 430 fractured by hammerblow at 100°C, showing loss of rectangular cleavage pattern due to plastic deformation preceding fracture. 760X.

FIG. 4—Fracture at 200° now completely obliterates block-like segmented pattern of earlier figures and discloses sets of new markings, presumably slip, disposed at 45° about a central spine. Only the fanlike gross pattern of the grain is retained. At higher temperatures, segmenting from slip completely prohibits expansive cleavage traverses suitable for photographing. 760X.

thermocouple tip was inserted and carefully packed with asbestos thread. A notch was then cut with the 90° edge of a flat file ¼-in. from the position of the thermocouple tip, the depth of the notch being kept to 0.10 ± 0.01 in. by placing over the bar a protective sleeve of hardened tool steel in which a guiding groove was cut. Fastened in a vise, the specimen was heated by a gas flame to the desired temperature, brought to a relatively steady state and fractured by hammerblow in one series of tests and by a 0.22-caliber rifle shot in another. The temperature control is estimated at ±0.02t, where t is the stated test temperature in °C. The fracture by rifle was from a fixed range of 24 in. from the muzzle. The specimen was flattened slightly by filing to receive the slug.

Fractures made by hammer blow

In the first series of tests on effect of temperature, all fractures were made by hammerblow. In Fig. 1, type 430 stainless steel is shown fractured at room temperature. The large size of the grains in this specially heat-treated material is indicated by the fact that the lefthand two-thirds of the field of the fractograph has a single orientation and therefore represents a single grain. The sharp rectangularity of the pattern is typical of these ferritic grades,[2] being even more pronounced in the higher chromium type 446. Austenite forms in this steel in minor proportions on heating, and some of the distortions in the pattern may be due to carbidic or pearlitic constituents. The principal traces are intersecting 100 cleavages, the fractograph itself being a 0.001 face; and even the meandering markings will generally break down on close observation to show themselves as stepwise composites of minute crystallographic cleavages. Close inspection of the detail in this and similar fractographs will also disclose minute and elaborate dendritic forms, which are basic to the grain structure.

No change at 35°C

Fractured at 35°C, Fig. 2, this steel provides no significant change in appearance. This temperature was chosen because for certain of the ship-plate steels it was found sufficient to change the pattern. Although fractotropy in the ferritic stainless steels has not been widely explored from a standpoint of temperature, it is known from researches on the effect of chromium content[3] that the transition occurs at room temperature for compositions similar to type 430; for type 446 it is clearly above room temperature. Fig. 2 shows a field whose crystallographically sharp edges at the left proves it has been segmented, but by cleavage rather than by slip. The field is markedly rectangular and minutely dendritic, typical of the grade.

At 100°C, however, intersecting cleavage has almost entirely disappeared. The fractograph

in Fig. 3 shows instead a leaflike facet with few crystallographic traces. The cleavage traverse is expansive and relatively smooth and flat, reminding one of E steel and its inferior toughness. The ferritic stainless steels are notoriously notch-sensitive and of inferior toughness, becoming more so with increasing chromium content. Some signifiant angular relationship can be found in the pattern of Fig. 3, for there are markings to left and to right approximately disposed at right angles to one another, and other markings show a strong inclination to be at 45° to the other sets.

In Fig. 4, this suggestive disposition of markings at 45° and 90° takes on more definite form with two sets of fairly parallel traces equally placed 45° about a central spine. The specimen was fractured at 200°C, where slip is known to occur. The markings at 45° and 90° on a cube fracture face are characteristic of 110 generally the most prominent slip family in ferrite.

Rectangular pattern disappears

These four fractographs clearly illustrate the obliteration of the characteristic rectangular pattern as the temperature of fracture is raised from 35° to 100° and above. That this obliteration is due to plastic movement will be demonstrated later by high-velocity fracture. The general fanlike architecture of the grain persists, however; and it is believed that the patterns of Figs. 3 and 4 may relate directly to an imperfection structure in the growth of the crystal.[4]

A similar series of experiments was next conducted using the higher chromium alloy, type 446 stainless. The fracture in Fig. 5, made at room temperature, shows the same rectangularity as discussed in Fig. 1. The field in Fig. 5 is more completely rectangular, in keeping with the higher chromium content and the almost complete absence of interfering phases. Note the symmetry of the pattern about the inclusion in the lower part of the field. Possibly this inclusion served as a focal point for the fracturing stress; or perhaps the total pattern is a growth form disclosing nucleation of the original grain at this inclusion, with or without initiation of fracture there. Other patterns show inclusions which lie in the fracture path and yet introduce no such effect. These latter are apparently entrapped in the crystal growth, not nucleating it, thus accounting for the distinction in patterns.

Raising the temperature to 35°C caused no observable change. The fractograph in Fig. 6 is particularly good for the comparison because a field is found closely resembling that in Fig. 5, even to repeating a pattern showing nucleation about an inclusion. Both of these fields also have a strongly marked spine visecting the 90° cleavage angle. In fact, in Fig. 5 the trace of the spine can be followed over the upper-left cleavage boundary onto the face receding from

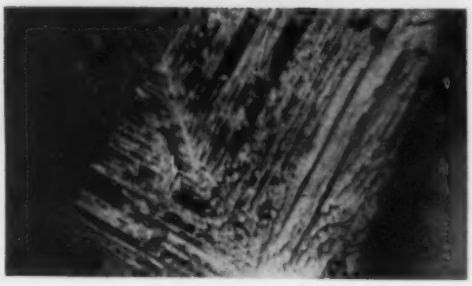

FIG. 5—Fractograph of type 446 fractured by hammerblow at 23°C, showing the typical blocklike rectangularity of chromiferous ferrite. The symmetry of the fracture pattern with respect to the inclusion at lower center is believed to represent the nucleation and growth of this grain from that point. 425X.

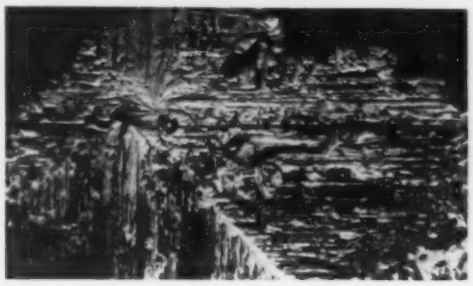

FIG. 6—Fractograph of type 446 fractured at 35°C, showing a field similar to that in Fig. 5 and disclosing no observable change in markings. Once again an inclusion is found at a place in the pattern suggesting nucleation of the grain. 425X.

FIG. 7—Type 446 fractured by hammerblow at 100°C, showing a loss of rectangularity, though not as severe as for type 430 in Fig. 3. 375X.

FIG. 8—Type 446 fractured at 200°C, showing complete loss of rectangularity, but not the incidence of slip markings found in type 430 fractured at this temperature (see Fig. 4). 425X.

FIG. 9—Type 446 fractured by hammerblow at 350°C, showing complete absence of blocklike cleavage pattern and a marked incidence of slip traces on a pattern almost identical with that for type 430 fractured at 200° (Fig. 4). 425X.

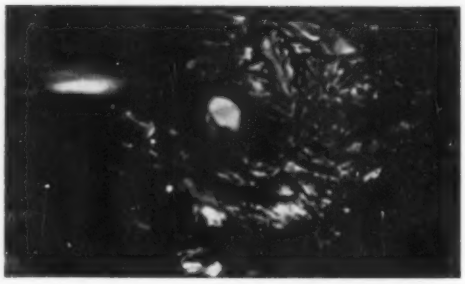

FIG. 10—Typical fractograph for type 446 fractured at 475°C by hammerblow (also for type 430 fractured at 350° and above). 760X.

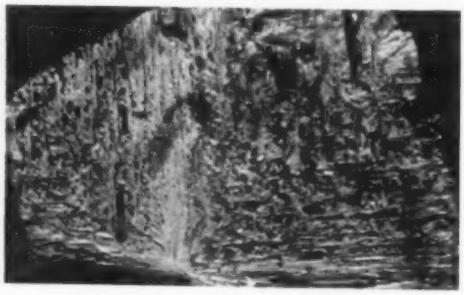

FIG. 11—Type 446 fractured by rifle-shot at 24°C, showing a typical ferritic cleavage, compare with Fig. 5. Nucleation of this grain is indicated at bottom-center. 425X.

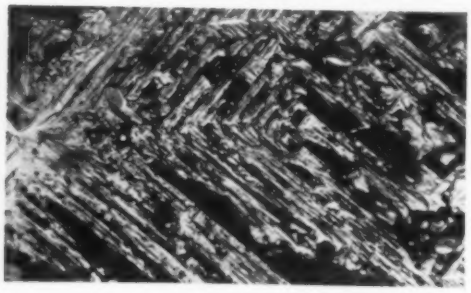

FIG. 12—Type 446 fractured by rifle-shot at 100°C, again showing excellent rectangularity. Comparison with Fig. 7 (also Fig. 3) discloses a marked repression of slip by this high-velocity fracture, with cleavage as the principal response to the deformation. 425X.

focus. Its position is suggestive of a 110 plane, and it may relate to the original crystal growth.

At 100°C the rectangular pattern has broken down, as shown in Fig. 7, though not as severely as for type 430. At 200°C, Fig. 8, all rectangular traces have disappeared; but comparison with Fig. 4 shows considerably less of the thin markings believed related to slip. This indication of more difficult slip conditions in type 446 is further borne out by the fractograph for fracture at 350°C in Fig. 9 where the pattern is very similar to that in Fig. 4 for fracture of type 430 at a temperature 150°C lower.

At 475°C, type 446 segments so completely by slip before fracture under hammerblow that fractographic patterns are almost unobtainable. Fig. 10 is presented, in spite of its photographic inferiority, as a typical example of the fracture field. Nowhere is there a cleavage traverse sufficiently flat and extensive to photograph, even at this high magnification.

When type 430 was fractured at 350°C and at 475°C, the same fields resulted as shown in Fig. 10. Throughout the two series for these steels, there are similar fracture patterns, but they differ substantially with respect to the temperature ranges in which the several pattern changes occur. This difference is consistent with the known greater notch-sensitivity and lower impact resistance of type 446, for it signifies a general hesitancy to slip under impact conditions and a greater tendency to respond by cleavage. These Class II ferritic stainless steels are often heated to temperatures slightly above 100°C in commercial practice because their ductility and "cold" formability greatly increase.[3] The reason for this helpful mill technique is illustrated by these fractographs.

Fractures made by rifle shot

In the third series, type 446 was again selected to serve as specimens, and the same temperatures for fracture were used to provide direct comparison with the preceding Fig. 5 through 10. However, all fractures were now produced by rifle shot.

In Fig. 11, fracture at 24°C discloses a pattern which is identical with the hammerblow pattern in Fig. 5, so far as observable fractographic changes are concerned. A nucleation spot again appears, here at bottom center. The fracture direction was recorded: from bottom towards top of the field. While this is in conformity in this particular instance with an interpretation of the nucleation marking as a focal entry point for fracture, which then spread to provide the given pattern, it is also possible that this marking refers directly to grain growth and intragranular architecture, and only indirectly to fracture.

At 35°C, the rifle-shot fracture disclosed a pattern so similar that it is not presented in

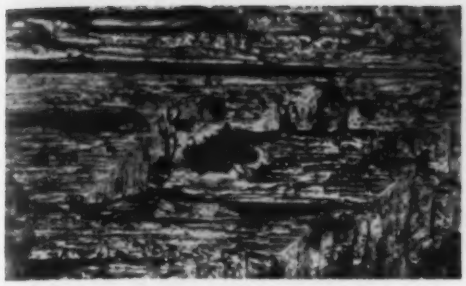

FIG. 13—Type 446 fractured by rifle-shot at 200°. While some deterioration in the cleavage pattern appears, the contrast with Fig. 8 is marked. 425X.

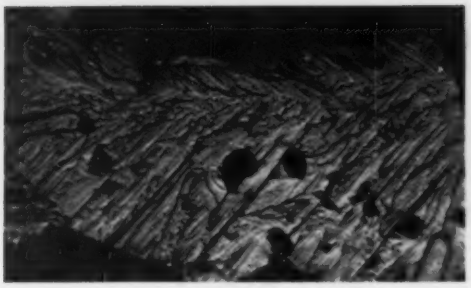

FIG. 14—Type 446 fractured by rifle-shot at 350°C. Although markings of the type attributed to slip in previous figures do appear, a limited amount of block-like cleavage is still in evidence and the pattern stands in considerable contrast to Fig. 9. 425X.

order to conserve space. At 100°C, the pattern remained as rectangular as at the lower temperatures. Fig. 12 is essentially identical with Figs. 5 and 6 for hammerblow fractures at 23° and 35°, respectively. The higher velocity has accordingly repressed slip at a temperature where slip becomes prominent for hammerblow fracture. This conforms with known effects of velocity of fracture in raising the fractotropic temperature.[5] Note the nucleation marking again in Fig. 12. The fracture direction for this specimen was from upper right to lower left, parallel to the one set of crystallographic markings.

In Fig. 13, fracture at 200°C continues to show blocklike cleavage, in contrast to Fig. 8. Actually, a range of patterns can be found in this specimen, a few rather closely approaching Fig. 8 in appearance; and that in Fig. 13 may perhaps be more rectangular than the average. Nevertheless, an important contrast is abundantly evident.

Differ at 350°C

At 350°C, rifle-shot fracture loses much of its blocklike markings, but still shows the clear contrast evident between Figs. 14 and 9, particularly in regard to the comblike slip arrays.

At 475°C, the effect of fracture velocity is made particularly evident. A few photographable facets can still be found in rifle-shot fractures, whereas they are virtually absent in fractures, made by hammerblow.

In addition to photographing typical fracture facets, an estimate was made for each specimen of the percentage of the fracture field covered by cleavage-type facets, of the so-called "brittle" area. In Fig. 15 these estimates are plotted to give an approximate idea of the fractotropic phenomenon on the basis of visual brittleness. The curve for hammerblow fractures falls from 100 to 5 pct between 200° and 350°, whereas the fall for rifle-shot fractures is in an expectedly higher range, from 350° to 475°. The data are for type 446. The arrows express the approximate transition temperatures judged from the fractographs, shown to lie in lower ranges than when judged from the macrofractures.

While such observations are only qualitative, they do show that subtle fractological changes are taking place which do not reflect clearly as visual changes in the macrofracture; and they confirm current evidence from other fields that the fractotropic phenomenon involves numerous and subtle variables which prevent the naming of a specific temperature, or even a temperature range, without specifying the conditions of the test.

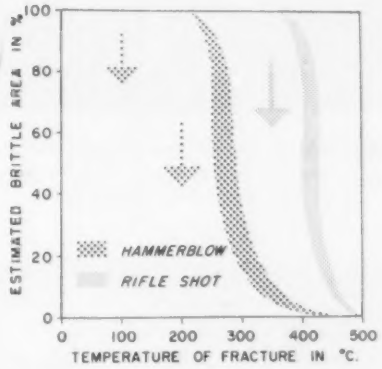

FIG. 15—Plot of visually estimated "brittle" area v. temperature of fracture with arrow indications for changes determined fractographically.

Acknowledgment

The authors are obligated to the Office of Naval Research for partial support of this study, and to M. E. Haslem and F. K. Landgraf for technical assistance.

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[2] *C. A. Zapffe, "Etude fractographique des alliages ferchrome," Rev. de Metallurgie, 44, No. 3-4, March-April 1947, p. 91.*

[3] *C. A. Zapffe, "Stainless Steels," Cleveland, ASM, 1949, 368 pp.*

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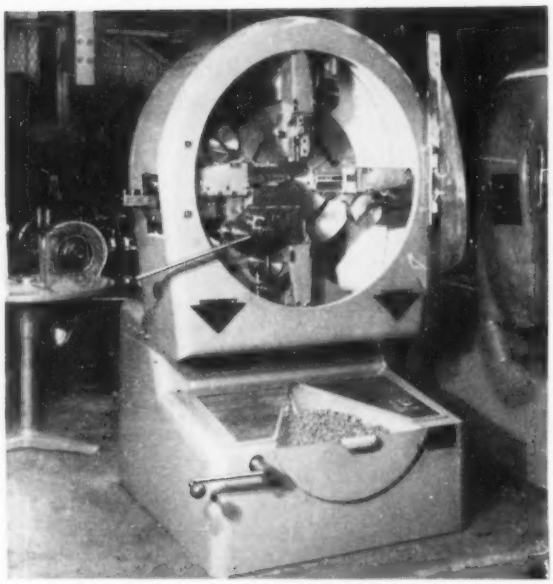
Unusual multislide machine shown at Festival of Britain

A number of interesting features complement the streamline design of a new radial multislide and strip forming machine built by Heenan & Froude, Worcester, England.

In addition to forming stations for wire products, the machine includes a press station for working strip up to ¾ in. wide. The standard machine has four slides mounted, but any number up to six radial slides can be accommodated, each separately adjustable for timing, stroke and dwell. Any slide not needed for production of a given job may be removed easily. Conversion through addition or removal of slides can be completed in about 5 min.

Slide units are operated by toggle gear instead of cams, so particularly heavy pressure can be applied. Approximately 20 tons can be applied over the last few degrees of toggle movement. About 3 tons can be applied to strip by the press station.

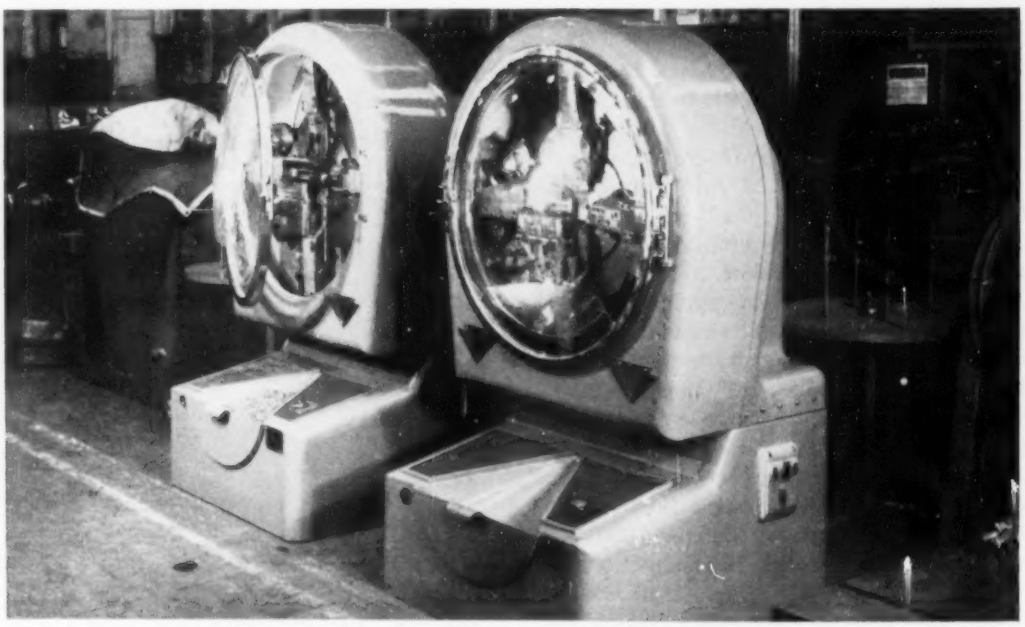


TOOLING AREA of multislide machine is accessible when door is open. Ejected finished pieces drop through scoop in door into bin at base of machine frame.

Door is transparent plastic

The plate on which slides are mounted is normally vertical, but can be tilted on trunnions if necessary to aid ejection of finished parts. A transparent plastic door protects the working area of the machine. The frame incorporates in its base a chute into which completed work falls after ejection. The entire cover is readily detachable for access to the machine.

In demonstrations at the engineering exhibit of the Festival of Britain, the machine is producing oil filter ferrules at a rate of 200 per min. The ferrules are about 0.47 in. diam and 0.47 in. long, with two embossed ribs all around the diameter. They are formed in two separate stages, first in a U, then into a closed circle with close-butting ends and no springback.



TRANSPARENT plastic door closes front of British multislide machine.

FIG. 1—With a rotary furnace and extrusion press similar to this design suggested by the author, light metal scrap can be fed continuously and bars of indefinite length produced. Scrap bodies remaining in the press between charges need not be removed, as there is sufficient welding effect to provide an adequate joining.

Direct Extrusion Applied to Light Metal Scrap

by Max Stern
Consulting engineer
New York

Dispersion of oxides, destruction of chip layers and almost normal properties were obtained in bars extruded at about 750°F and 15 tons per sq in. Rounds, profiles and notched ingots for deoxidation of steel can be produced at or near the point of origin of aluminum scrap.

As supplies of fine aluminum and magnesium increase, the need for more modern and efficient methods of recovery grows. The strong oxide films that surround all the aluminum turnings, grindings and other such fines are particularly troublesome when this material must be remelted. Irregular inclusions of oxides and melting losses are unavoidable. Slabs and billets made only from this raw material cannot be used for rolling or extrusion. Costly refining or blending with considerable quantities of virgin or solid metal is required.

Direct extrusion of such light metal scrap has been done successfully on an experimental basis. The method[1] used is simple enough so that the reclamation could be done at or near the point of origin of the scrap. This would make keeping the materials segregated and classified simple and more certain. There are no metal losses.

Tests of the extruded $\frac{5}{8}$-in. diam aluminum and magnesium bars were performed in the laboratories of Sam Tour & Co., Inc., New York. Test bars showed almost normal physical properties for the materials involved, Table I. Chemical analysis of the bars made from 17ST aluminum scrap indicated that quantities of alloying elements were average for this material, Table II.

The fact that oxide films, particularly those covering all fine aluminum scrap, are so minutely divided and evenly distributed makes it possible

TABLE I

PROPERTIES* OF EXTRUDED SCRAP

Tensile tests

Specimen	Diam in.	Area sq in.	Ultimate strength psi	Pct elongation in 2 in.
Magnesium	0.374	0.110	29,800	8.5
Aluminum	0.461	0.167	49,000	13.5

Hardness tests

	Range	Scale
Magnesium	63.5–68.5	Rockwell H
Aluminum	66.0–69.0	Rockwell F

* Without previous heat treatment.

TABLE II

COMPOSITION OF EXTRUDED 17ST ALUMINUM SCRAP

	Actual pct	Required —17ST pct
Copper	4.07	3.5–4.5
Magnesium	0.63	0.2–0.8
Manganese	0.52	0.4–1.0

Direct extrusion (continued)

to overcome their weakening effects by direct extrusion. This dispersion of oxides is maintained by the hot compression that occurs in the extrusion process. The oxide films are shattered and disrupted, creating clean, new metal contacts[2].

Experimental extrusions were made of scrap consisting of aluminum turnings, borings, foils and grindings. It was found that such material can be fed either loose or after previous baling. Properly cleaned, the scrap was heated and fed into the experimental extrusion chamber. This resembles a 3-in. ID cylinder with 1-in. thick tool steel walls. The extrusion die and ram were made of the same material. An electrical, direct resistance heating unit surrounded this extrusion chamber and the temperature of the scrap was raised to about 750°F. A pressure of 15 tons per sq in. was exerted by the standard vertical testing press in which the extrusion unit was placed.

Consistency is similar to lead

The heat and pressure develop a consistency in the scrap similar to that of cold lead. In the first compressing stage, a dense aluminum or magnesium body is formed. As pressure goes up to the point required for extrusion, solid rod or profiles are obtained.

This type of scrap can also be brought to a flowing condition in a rotating furnace after a certain temperature is reached.[3] It is then ready to be fed continuously into an extrusion press. This means that bars of indefinite lengths can be produced. Scrap bodies remaining in the press between charges of metal do not have to be removed before extrusion can be resumed. Suggestions towards the design of a rotary furnace and press are given in Fig. 1.

By attaching a pressing device at the exit end of the extrusion press, small notched ingots of any length and with any desired cross-section can easily be produced from the still-hot metal.

FIG. 2—Examples of bars extruded from 17S aluminum scrap: a) cross-section of billet from extrusion press still joined to extruded bar; b) portion of diagonally fractured bar showing fibrous condition; c) original turnings may be seen on tip of this first section of bar extruded from newly charged scrap; d) a broken tensile bar; e) machined bar extruded from scrap.

Such notched bars constitute excellent ingots for the deoxidation of steel.

Examples of rod and bar extruded from aluminum scrap are shown in Fig. 2. These include, a) cross-section of billet as formed within the extrusion press still joined to the extruded bar into which it is formed by the extrusion die; b) a portion of extruded bar fractured longitudinally, showing a fibrous condition; c) showing how original turnings may still be seen in the first portion of bar that comes from press when first charged with scrap; d) a broken tensile bar; e) a machined piece from the same bar.

Figs. 3 and 4 are longitudinal and transverse micrographs of bars extruded from aluminum scrap.

Figs. 5 and 6 give similar views of the microstructure of bars extruded from scrap magnesium.

As can be seen from these microphotographs, even dispersion of oxides is accomplished by this extrusion process and the chip layers are destroyed.

While properties of the scrap aluminum and

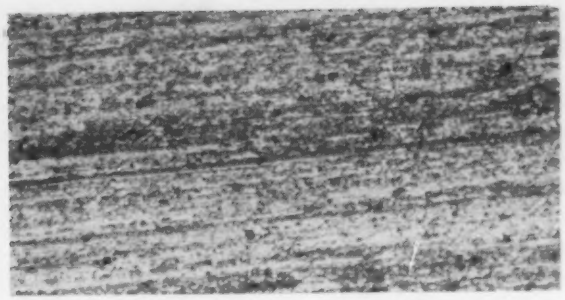


FIG. 3—Longitudinal section of 17ST aluminum bar extruded from scrap. Keller's etch, 50 pct. 100X.

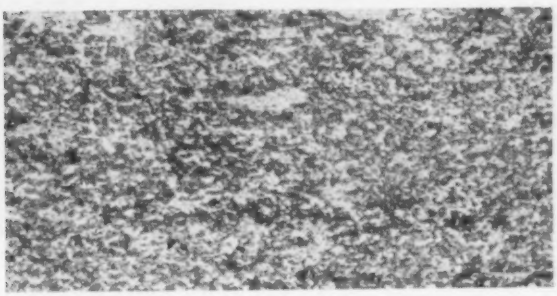


FIG. 4—Transverse section of 17ST aluminum bar extruded from scrap. Keller's etch, 50 pct. 100X.

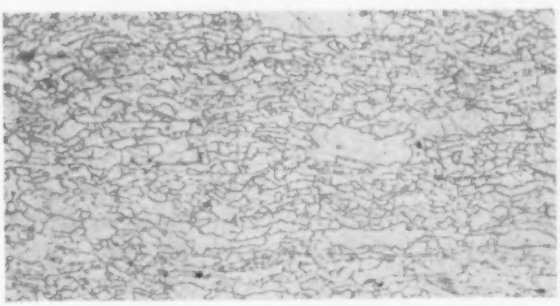


FIG. 5—Longitudinal section of commercially pure magnesium bar extruded from scrap. Glycol etch. 100X.

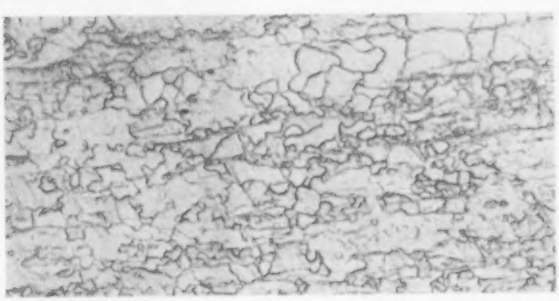


FIG. 6—Transverse section of commercially pure magnesium bar extruded from scrap. Glycol etch. 100X.

magnesium bars approach those of new material, at present their use in applications requiring the highest tensile strength is not recommended. However, a great many applications exist where the properties now available in this material are more than adequate.

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[1] *U. S. Patents 2,391,752 and 2,358,667.*

[2] *U. S. Patent 2,302,980.*

Max Stern, "Mechanical Ingoting of Aluminum and Magnesium Turnings," THE IRON AGE, Aug. 12, 1943, p. 90.

[3] *U. S. Patent 2,302,981.*

Speedier Stamping of axle housings with greater safety

by R. E. Hansen
General supervisor
Production Engineering
Oldsmobile Div.
General Motors Corp.

By using automatic transfer mechanisms and a belt conveyor, Oldsmobile has eliminated all risk to the operator. The 25 pct higher output per press will soon amortize the cost of providing and installing the necessary equipment.

Oldsmobile Production Engineering, in cooperation with the safety director's staff, recently has altered the setup for producing axle housings in the axle plant of the Oldsmobile Div., Lansing, Mich. A primary aim in making the changes was to improve safety factors. This was especially important in the draw and restrike presses where loading, transfer and unloading were done by hand. In these operations and those in the preceding press, transfer and unloading are now completely mechanized. Loading is done by hand but in positions where maximum safety is assured.

Progressive die forms reinforcements

Blanking is accomplished in a conventional setup from 0.172-in. stock. Blanks are stacked for delivery on pallets to the Bliss press shown in Fig. 1. In this press, a five-station progressive die produces folded reinforcements at the "banjo" or center portion. Next, it forms the work piece into a trough-like or flattened U-shape, as indicated in Fig. 2. To facilitate this operation, the press is equipped with a loading magazine at one side and the die is provided with transfer bars that shift the blank and work pieces from station to station.

With this setup, the press runs continuously. All the operator has to do is keep the magazine loaded and see that the die is functioning properly. As the magazine is not under the die itself and the operator does not have to reach between platens to load the magazine, safety is assured. The long blanks are picked up one or two at a time and slid longitudinally into the magazine.

For the first operation, the transfer bars slide the bottom blank from under the magazine, shift it to the first forming position and lower it into the die. At the same time, work pieces already in the dies are advanced from one station

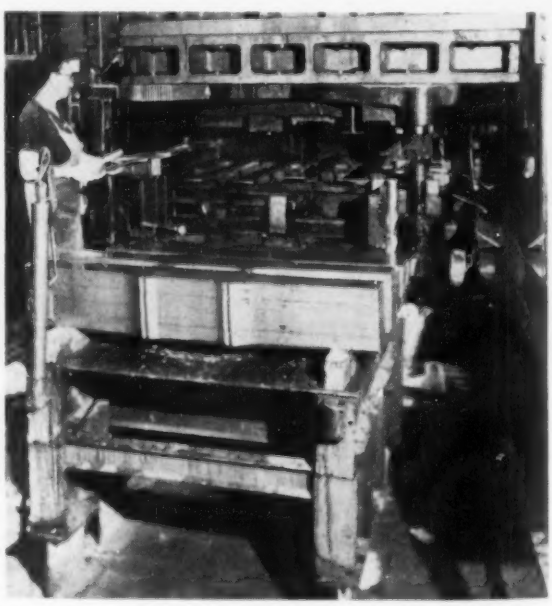


FIG. 1—Progressive die setup in a Bliss press. Blanks from stacks in foreground are loaded into a magazine by the operator and are shifted from the magazine across the die, left to right, by a transfer mechanism in five steps.

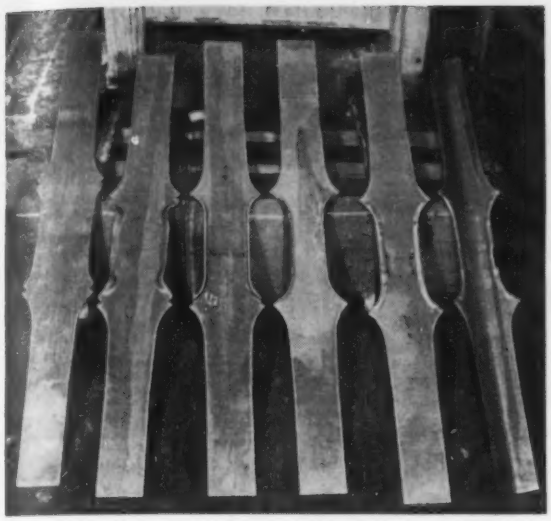


FIG. 2—Blank for a half axle housing, left, and work pieces as they appear after forming operation in the five successive stations of the transfer die shown in Fig. 1. Four slower, secondary presses are supplied with trough-shaped piece, extreme right, for the second operation.

to the next. The piece in the last station is dropped onto inclined bars down which it slides onto a belt conveyer at the bottom of a trough. The press is wide enough so that the belt can run between platens and still be clear of them and of the die when the press closes.

At the first station, flanges are formed upward along the center portion of the blank at an angle of about 45°. At the second station, further forming brings the flanges to a 90° angle. In the third position, the flanges are bent inwardly about 45°. The fourth die flattens them back against the top face of the work piece. Finally, at station five, the whole blank is given a trough-like shape.

Secondary presses produce half banjo

As this progressive die runs continuously and following operations are much slower, this press feeds four secondary presses. There are switches that divert the formed pieces from the main belt to other belts, keeping these four presses supplied. Small banks are permitted to build up at each secondary press. The banks are located without manual handling, at points from which the pieces are picked up one at a time and fed into dies. This arrangement avoids all manual handling save that involved at the secondary press loading and unloading points.

Each secondary press first performs the severe draw that produces a half banjo having double-thickness flanges. The two end portions are converted into half tubes. Upon ejection from this die, the workpiece is transferred into a restrike die cavity that sets the shape to its final form. Upon ejection from the second position, the finished stamping is transferred again and dropped into a chute down which it slides. It is lifted manually and hung on an overhead chain conveyer.

In Fig. 3 is shown, from the rear, one of the four secondary dies set up in an HPM hydraulic press of 1000-ton capacity. The only manual labor required at this press is to load a hand slide. This is drawn outward. After being loaded, it is pushed back to the position shown at right in Fig. 3 before the press is tripped. As loading of the slide is done well outside the die and transfer to succeeding position is done automatically, all reaching under the die is now eliminated.

With this new arrangement, safety is not the only advantage. Transfer takes place more rapidly and loading is more easily done. The result is that output per press has been increased about 25 pct. Savings on this score alone will soon amortize the cost of providing and installing the transfer mechanisms.

Operation of the shifting devices is effected by an airdraulic system that actuates a plunger controlled by solenoid valves. These valves respond to limit switches tripped by a dog attached to the press ram and shown at right in Fig. 3. Portions of the transfer mechanism appear below the die in Fig. 3. These are duplicated in part on the opposite side (front) of the press. The rocker arm, lower right in Fig. 3, is on a shaft that extends across the press to a similar arm at the front of the die.

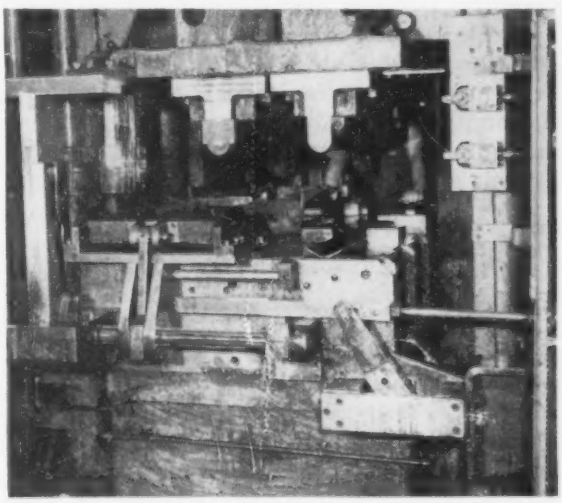


FIG. 3—Setup in an HPM press equipped with a three-station die that completes forming operations on half housings. The transfer mechanism shifts work pieces from right to left and drops finished stampings into a chute (not shown).

When this shaft is rocked, cam-actuated parts pick up the blank and the two other work pieces at each end and lift all three vertically. Next slides shift the work pieces horizontally and then cams lower them at the next station. The finished stamping drops into a chute. When these motions are completed, the die closes, the new blank is drawn and that previously drawn is restruck. After the die opens, the transfer mechanism retracts, a new work piece is loaded and the cycle is repeated.

DIAMONDS FROM DUST

With diamond powder worth $7 a gram, recovery from metal waste piles has become very attractive. Wet separation is more effective than dry separation; however other media than water are used.

By R. S. Young and A. D. McDonald

Diamond Research Laboratory
Johannesburg, South Africa

In many industrial operations of grinding, cutting, sawing or polishing, small quantities of diamond powder are left as a waste product contaminated with larger amounts of finely-divided metal. The high price of diamond powder, over $7 a gram, and the fact that used diamond powder still retains its original hardness and abrasion resistance, makes the reclamation of this strategic material in many cases attractive.

A wet magnetic separation is better than one carried out dry. Water is not satisfactory as a liquid medium, since it does not wet clean diamond powder, and if oil or grease are present in the contaminating metal, water will not wet this material either.

Ferrous metals magnetically separated

If the contaminant is a ferrous metal, the first step is a magnetic separation. The sample is placed in a large porcelain evaporating dish or flat-bottom glass basin with sufficient carbon tetrachloride or methyl alcohol to cover the solids. A cylindrical magnet having about 1.5 in. diam is inserted into a 100-ml tall Pyrex beaker. The beaker is stirred around in the wet sample. Magnetic material adheres to the beaker leaving the powder in the basin. On withdrawing the magnet and the beaker from the basin the material is released from the exterior of the glass when the magnet is withdrawn from the beaker. The procedure is repeated holding the beaker containing the magnet about ¼ in. above the solid material in the basin and removing smaller quantities of magnetic materials each time. Depending on the size and quantity of the metallic contaminants, this procedure must be repeated 3 to 8 times until it is seen that no more magnetic material is left behind in the basins.

The nonmagnetic or diamond portions are allowed to settle. To separate the diamond powder, the liquid can be decanted, filtered, distilled or centrifuged. The powder is then heated in a muffle furnace having accurate temperature control to 400°C for ½ hr. A temperature of 425 to 450°C is the maximum to which fine diamond powder, around 200 to 325 mesh, can be heated in air without loss.

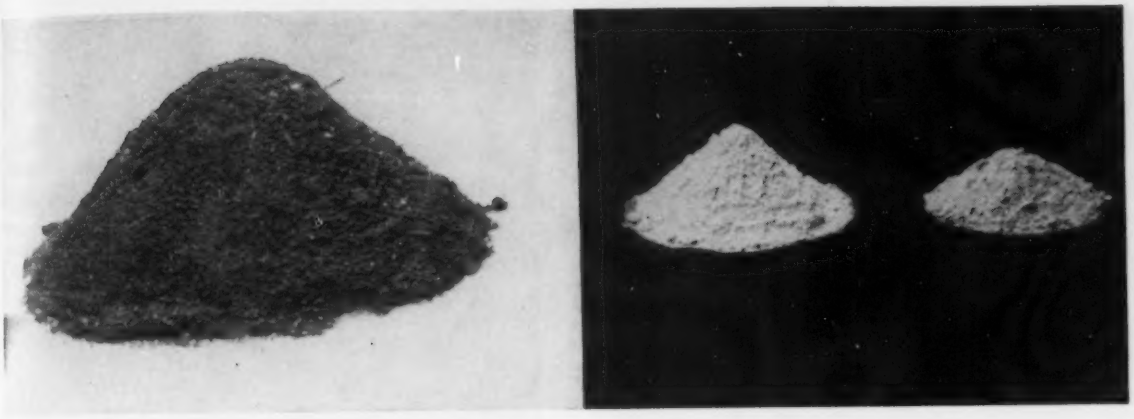
For some processes, the recovery of the nonmagnetic material in this manner will yield the greater part of the diamond powder. In most cases, however, as much as a third or more of the diamond powder will be embedded in the metal and will remain with the magnetic portion.

The recovery of this embedded diamond powder can be effected in two ways, by acid digestion or alkali fusion. For ferrous materials, fusion is preferable in several respects, particularly where the services of a chemist or a laboratory are not readily available for such reclamation. Fusion for all samples, especially for unknown materials, is recommended. If cemented carbides, for instance, are present in this metal waste, they too will be brought into solution by the fusion.

Fusion frees embedded powder

In the fusion process a quantity of potassium hydroxide to which has been added about 1 pct potassium carbonate and 1 pct potassium nitrate, approximately twice the weight of that of the diamond and metal powder, is placed in an iron pot and melted. The impure powder is slowly poured into the molten alkali. With occasional stirring and addition of small quantities of the molten alkali the fusion assumes a slight green color in about 2 hr.

The pot is cooled, water is added and the solution brought to a boil. The contents are allowed to settle after boiling and the liquid is then decanted. The alkali is washed out by several decantations. A mixture of 9 parts hydrochloric acid and 1 part nitric acid is added and the solution is heated until reaction ceases. The acid solution is washed several times by decantation. The diamond powder is transferred



340 GRAMS OF METAL WASTE containing diamond powder is shown above at the left. The center pile contains 101 carats of diamond powder recovered from the pile of waste by magnetic separation. The pile at the right contains 41 additional carats which magnetic separation did not remove from the original pile at left but which were recovered by the fusion method.

to a flat porcelain dish or tray, dried in an oven, and finally heated to 400°C in a muffle.

Potassium hydroxide is much better for such a fusion than sodium hydroxide, showing less tendency to creep and giving a shorter fusion period. If the diamond powder is very fine it may be necessary to allow the liquid to settle overnight before decanting, or to centrifuge it in order to separate the phases.

Non-magnetic metals are dissolved

If the contaminant is a nonmagnetic metal, fusion or acid treatment is applied directly to the impure powder sample. For many nonferrous metals, acid treatment in a large beaker with 3 parts hydrochloric to 1 part nitric acid is an alternative procedure to fusion. When the metal has dissolved completely, the solution may be decanted from the diamonds if the latter are of sufficient size to sink readily in the liquid. If the diamonds are extremely fine, it may be necessary to centrifuge the solution. After washing the residue free of all acid, it is transferred to a porcelain or silica dish, dried in an oven and heated in a muffle to 400°C for ½ hr.

If there is an appreciable quantity of silica in the metal powder, it will not be removed from the diamond in the above acid treatment. In this case the final diamond residue will have to be placed in a platinum dish with hydrofluoric acid and the silica removed by evaporation. In the fusion treatment, the silica is rendered water-soluble and removed with the washings.

The presence of a large quantity of nondiamond carbonaceous impurities in a sample necessitates another step in the recovery process, if acid treatment is employed, but it does not interfere if the fusion procedure is followed. After solution in the hydrochloric-nitric acid mixture and washing by decantation, the diamond residue in a large beaker is covered with a cleaning solution of concentrated sulfuric acid saturated with sodium dichromate, and kept warm on a hot plate for ½ hr. After cooling, the cleaning solution is decanted and may be saved for re-use until it acquires a green tinge. The diamond powder is washed thoroughly by decantation or filtration, transferred to a porcelain dish, dried and heated in a muffle to 400°C.

The reclamation of diamond powder by these procedures is a fairly rapid operation, requiring little equipment, and it can be performed by any intelligent operator. We believe the introduction of such recovery measures in many industries would result in lower costs and a better utilization of expensive diamond powder.

NEW BOOKS

"Die Casting," by H. H. Doehler, is written from the 50 years' experience of this pioneer in the die-casting field. Practical, plant-tested data on the production, engineering, and materials of die-casting equipment are detailed. The book covers composition, properties, and applications of die-casting alloys. It describes recommended melting practice and analyzes die-casting design. Practical information is given on die construction and materials. Permanent-mold casting, sand casting, powder-metallurgy, plastic molding, and several others are compared along 10 points with the die-casting process. Die-casting finishes, and safety standards for die-casting shops are discussed. McGraw-Hill Book Co., 330 W. 42nd St., New York 18. $8.00. 502 p.

Machine Hot-forms Tubing Into Complex Parts

By John Kolb
Assistant Editor
THE IRON AGE

Under the same roof, tubing up to 10 in. diam is precision-sized and then hot-formed into complex, finished parts. Rejects are cut to a minimum and ordinary fabricating and joining operations eliminated. Combination of convergent-divergent sections, graduated diameters, wall thicknesses and closed ends is obtainable.

Machines now being made by Federal Machine and Welder Co., Warren, Ohio, take tubing up to 10 in. in diam and form it into cylindrical parts and structures in one or two passes. Designs having differing wall thicknesses in a single piece, graduated diameters, adjacent nosed down or flared sections, closed ends or other such details are commonly produced. To duplicate most of the finished parts turned out by this hot-compression method would require combinations of two or more production processes, such as machining, spinning assembly, welding or deep-drawing.

The Westin process, as this tube-forming technique is known, is also used by producers of fire extinguishers and gas cylinders.

Two of these machines have been installed and have been in production in the Wallington, N. J., plant of Tube Reducing Corp. for some time. So far as is known, this makes this plant the first one where tubing is compression-sized to close tolerances and then fabricated into finished parts under one roof.

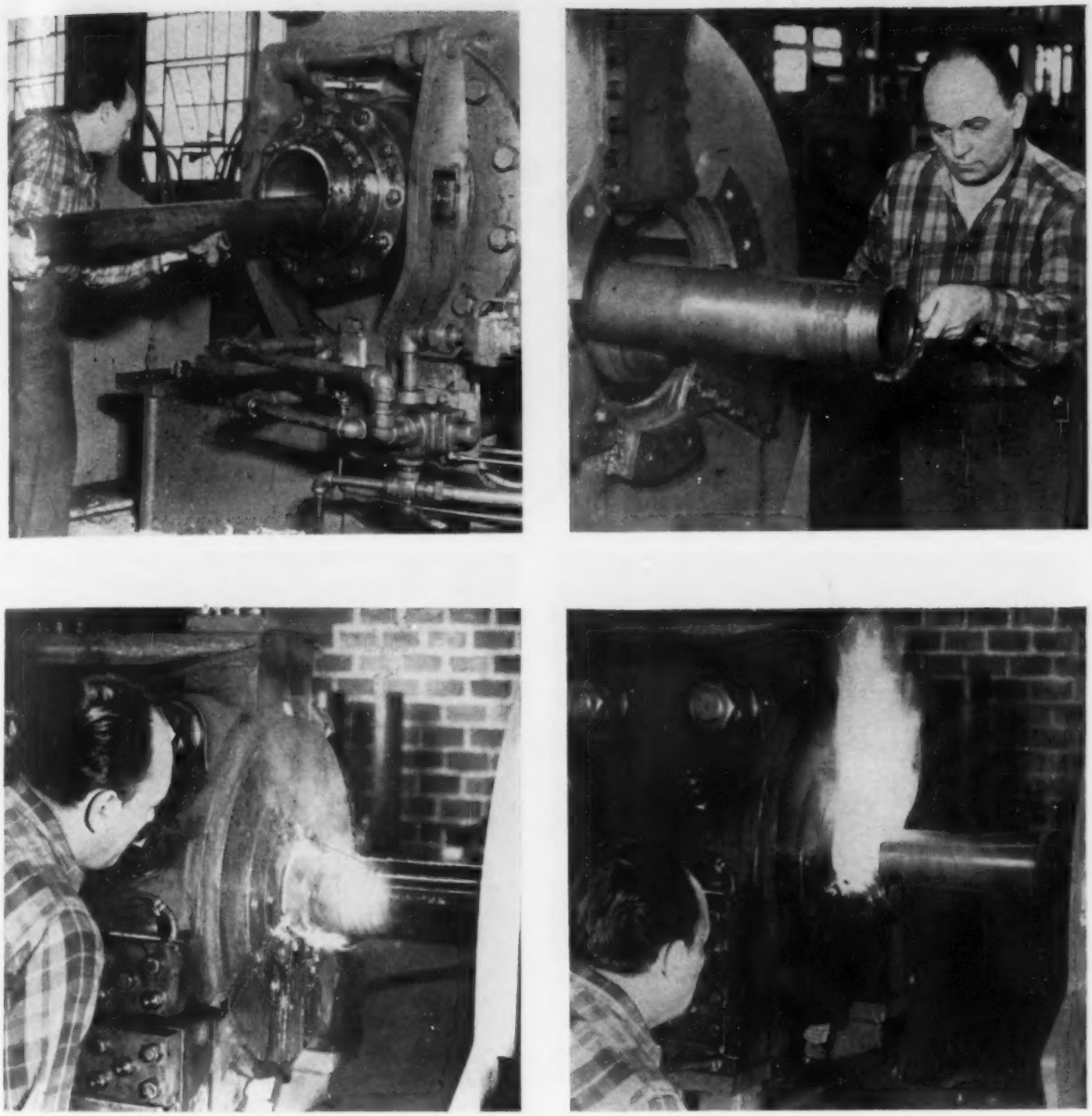
Such integration has advantages

There are advantages in such an arrangement. Customarily, the supplier of production materials such as tubing are permitted to consider an order completed when they have shipped either 3 pct over or under the actual amount involved. If considerable overage has been allowed by the user in ordering to compensate for shrinkage, a lot of tubing can be left in stock after a production run has been completed.

Should rejections run high and the supplier take advantage of his right to ship 3 pct less than the stated amount, a serious shortage can result. Rejects themselves are also reduced with the Westin process. This is due to the fact that a part being produced can be checked as soon as the first one comes out of the machine.

To fabricate a given part in the new machine, a section of tubing is inserted from either side of the chuck and secured there by hydraulic pressure. The chuck rotates and advances the work piece towards the die housing where it is preheated. Within the first few inches of this housing, the tube reaches white heat as current

LONG, NOSED DOWN tubes are for aircraft landing and flap control gear. At right, are rocket and "jato" bodies.



FORMING LANDING GEAR side brace on 10 in. Federal-Westin machine. Upper left, loading cold-sized tube through rear of hollow spindle; upper right, lubricating the tube; lower left, actual hot-forming of one end of side brace; completed tube end leaving dies.

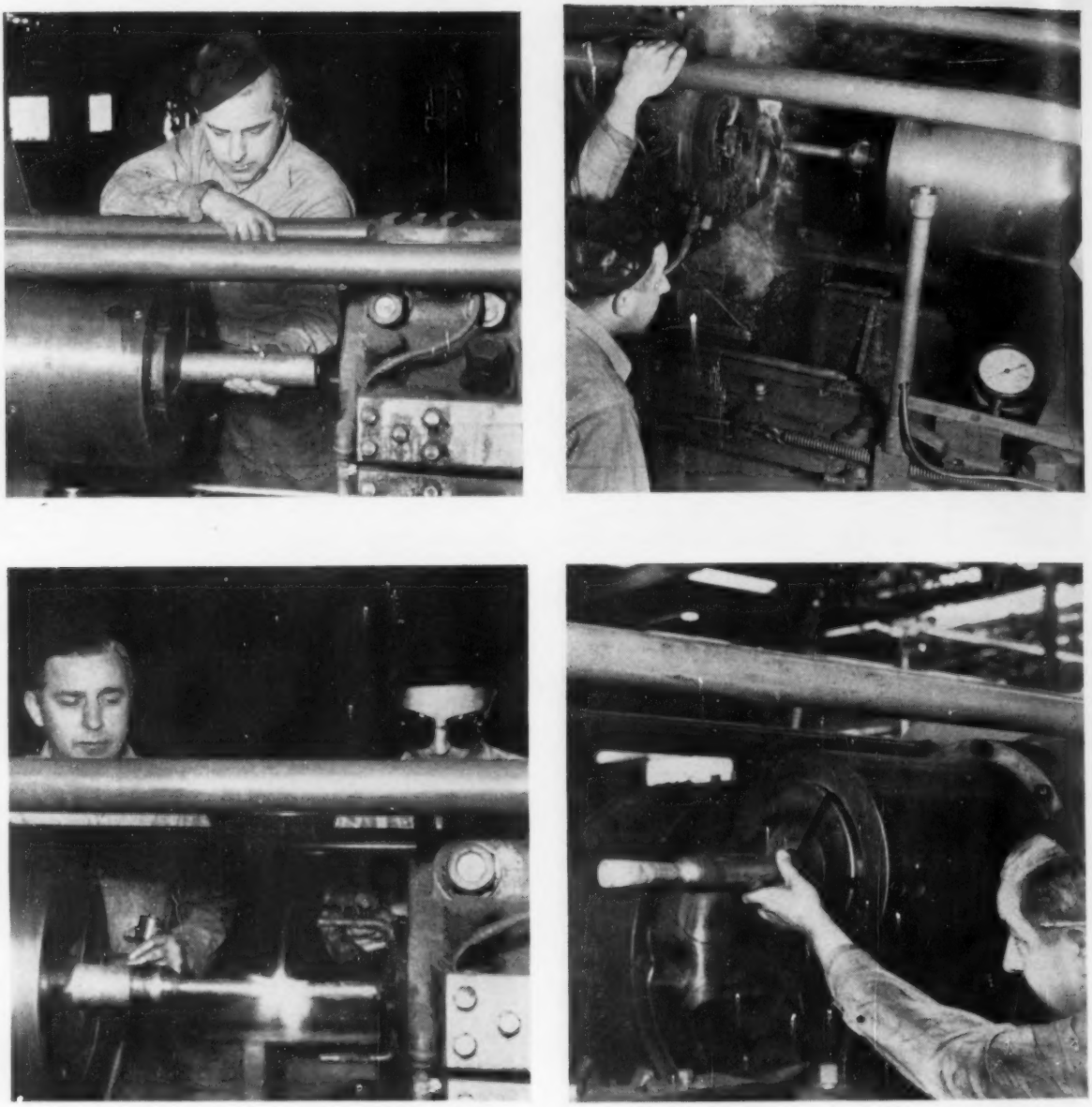
of low voltage and high amperage is passed through it. Dies and/or mandrels then impart the desired contours in one or more passes. The sequence can be performed under either manual or automatic control.

These dies are of the segmented, three-piece type, with each section insulated from the others. They are made of a high-chromium, high cobalt tool steel. Machines of two different sizes are now being manufactured. The larger one has a rating of 660 kva and forms tubing up to 10 in. in diam while the smaller unit is rated at 400 kva and handles tubes up to 5 in.

Three variables determine wall thickness and surface characteristics of the finished part. These are: a) temperature produced in the tubing, b) speed of platen travel, c) chuck speed.

Either drawn or welded tubing, in the fully annealed condition, can be fabricated by this new hot-forming equipment. Correction of poor concentricity, circularity or surface finish is accomplished to limited extent by the dies and mandrel.

However, for closer tolerances and good surface characteristics, the cold compression-formed tubing produced by Tubing Reducing Corp. gives the best results. This tubing is sized by semi-circular, taper-grooved dies that rock back and forth, compressing tubing against a mandrel. This technique provides tubes with a finish approaching that of a good machined surface. Required dimensions are closely held and a high degree of concentricity and circularity is obtained. In effect, the "Rockrite" process,



FORMING ROCKET BODY on 5-in. machine. Upper left—placing tube blank in chuck; upper right—withdrawal from dies after first forming pass; lower left—preheating nosed-down section immediately before expanding it over mandrel. (Preheating is required before all forming passes). The last operation shown is removing the completed rocket body from the chuck.

Hot-forms tubing (continued)

as it is known, cold forges tubing, causing the metal to flow both longitudinally and circumferentially. High mechanical properties are another characteristic of this product.

To date, carbon steels, alloy steels, certain stainless steels, aluminum alloys 14S and 61S have all been successfully formed by the Westin machine. At Tube Reducing Corp., braces and struts for aircraft landing and flap control gear, rocket and "jato" bodies with convergent-divergent nozzles, compressed gas bottles, completely closed tubes, conveyor rolls and other parts requiring reduced sections with heavier walls have been fabricated in quantity.

Production rates are impressive when it is understood that the Westin machine is used for those cylinder-based parts that could only be fabricated by a combination of forming and joining operations. As an example, eighteen of the jato bodies shown in one of the accompanying photographs are turned out every hour. This figure would be higher if it were not for the fact that two passes are required.

It is of interest to note why the large end of this jato shell is left open. The reason is the method of fusing this takeoff assist rocket and loading it with propellant. This must be done from the large end. If it were not for that, the part could be completely closed at the large end after the nozzle had been formed. No separate, threaded cap would then be needed.

Changing dies for a production run involving a differently shaped part is easily done. Only 20 to 30 min are required.

ASTM meeting covers variety of testing problems

The program presented to members of the American Society for Testing Materials at their annual meeting held in Atlantic City last week was varied enough to suit almost any engineer. It ran the gamut from A (Acceptance Sampling) to X (Xeroradiography) and included over a hundred formal papers and several hundred reports—not to mention some 547 technical committee meetings.

Two papers given before Committee E-7 on non-destructive testing were particularly interesting. Henry M. Staats, Magnaflux Corp., described a novel method for finding cracks in porcelain enamel, one which has been under development for several years. Cracks too small to be seen by the human eye can be detected by a magnetic particle process, he said. While porcelain enamel generally does not contain such cracks, they do appear at times and can cause discoloration of the enamel or corrosion of the base metal. Even if they don't do either of these things, such cracks can be used to predict performance or indicate the need for design changes.

Usually, Mr. Staats pointed out, plants using porcelain enamel check for cracks by rubbing the surface with lamp black in oil. This technique will not reveal fine cracks that may later give trouble under thermal shock or other field conditions. The magnetic method, called "Stataflux," causes sprayed-on powder to "hill" along the cracks so they can easily be seen with the naked eye. The method has already been used in some shops, permitting analysis and subsequent redesign of appliances which had been giving trouble in the field even though they passed plant tests.

Xeroradiography developments reported

Three engineers from Battelle Memorial Institute collaborated in presenting the latest developments in Xeroradiography at the non-destructive testing committee session. Xeroradiography is the process which substitutes sensitized paper for X-ray film—bypassing the usual devel-

TRUMAN S. FULLER, engineer-in-charge, works laboratory, General Electric Co., is the new president of the ASTM.

LESLIE C. BEARD, JR., asst. director, Socony-Vacuum laboratories, Socony-Vacuum Oil Co., new ASTM vice-president.

NEW ASTM DIRECTORS, left to right, include: R. A. Schatzel, vice-president and director of engineering, Rome Cable Corp.; John W. Bolton, director of metallurgical research & testing, The Lunkenheimer Co.; and F. P. Zimmerli, chief engineer, Barnes-Gibson-Raymond Div., Associated Spring Corp. Other new directors named are: Stanton Walker, director of engineering, National Sand & Gravel Assn.; and E. O. Slater, president, Smith-Emery Co.

oping process. Indications are that it is less expensive and faster and that in time of emergency it can take some of the pressure off film suppliers.

The Xeroradiography progress report by M. D. Phillips, R. C. McMaster, and S. A. Wenk, all of Battelle, showed encouraging results on new methods of handling the exposed paper. One involves blowing a liquid which settles onto the paper as a powder; another is rolling a pigment across the plate. The result is an inexpensive permanent record with good definition. Xeroradiographs so treated can even be photographed on 35-mm film. Development work is still incomplete and the new processes are not yet available commercially.

Other papers in the metalworking field included bulk sampling, quality control and a number on methods of testing and operating testing apparatus. The Marburg Lecture, delivered by F. L. LaQue, International Nickel Co., was on corrosion testing. Several awards of merit were made at the same session. The Charles B. Dudley medal was awarded to Professors D. S. Clark and P. E. Duwez, California Institute of Technology for their paper on strain rate and tensile properties of steel, presented at the 1950 meeting. R. L. Templin and W. C. Aber, Aluminum Co. of America, won the R. L. Templin award. The Sam Tour award went to C. T. Evans, Jr., The Elliott Co., for an elevated temperature study.

Aluminum honeycomb uses cited

Aluminum honeycomb core material for use in "sandwich construction" has outgrown the experimental stage, according to a paper by T. P. Pajak, The Glenn L. Martin Co. Now used on production structures, the combination of aluminum facings, aluminum core and a special adhesive gives a structural material with good strength and rigidity. A variety of airplane parts has been made of aluminum core and recent trends indicate that more new airframe designs are using aluminum honeycomb sandwich construction.

A new approach to bulk sampling was outlined by Joseph Manuele, Westinghouse Electric Corp., who argued that materials handling equipment should be designed with the sampling problem in mind. It might be so arranged, Mr. Manuele suggested, that material from different lots is laid down like layering of coal piles so that a vertical slice would be more nearly the average of the lot.

Don't miss "Boron Steels"

Civilian production requiring alloy heat treated steel parts will have to depend on the new alternate boron steels. A series of technical articles on these new steels will start in next week's issue. It will be complete with latest information on heat treating, carburizing and machining characteristics of the new grades. Case histories of application in gears, axles, springs and allied parts will be presented in detail. Experiences of manufacturers who have the new steels in production and the hardenability information available on these actual applications will be cited.

news of industry

Wage Controls Won't Pin Down Steel Labor

USW's Murray will ask something like 15¢ an hour wage hike in November . . . May ask pension improvement . . . USW knows wage formula is flexible . . . Steel profits off—*By John Delaney.*

Steel labor will not hold still for wage controls: Next November Phil Murray will demand a wage increase for his United Steelworkers of America—something like 15¢ an hour. He may even ask for a better deal on pensions even though this is not negotiable until 1954. He will get his wage increase, perhaps make a deal on pensions.

Phil Murray knows there is no ceiling on wages. The Wage Stabilization Board has several times permitted increases in excess of the formula—10 pct above January 1950 levels. This formula will be revised upward, anyway, and the steel workers will keep pace, perhaps set the pattern for a new ceiling.

Steel on the Spot

New wage demands will put the steel industry on the spot. Without assurance of higher prices, the industry will reject them. They couldn't afford to do otherwise, because price controls and higher taxes already are squeezing profits. Despite higher production and shipments, first quarter earnings reports were off slightly from 1950. Roger M. Blough, executive vice-president and secretary of U. S. Steel Co., said recently that if price control policies continue as they are, the industry's dollar earnings may be reduced more than 50 pct from the 1950 rate.

The steel workers will be prepared for a rejection. They may even ask for another fact-finding board with an offer to accept in advance its findings. This could lead to a repetition of a pattern which in the past has resulted in a compromise on wages and prices.

Steel union members generally speaking might be considered as well off today as they have ever been. They are assured of steady work for some time to come, and many of them are able to earn overtime bonus rates due to the tight labor market. Still they are as much the victims of inflation as anyone, and they are well aware that a dollar will not buy as much as it did a year ago.

Want the Extra Buck

They are anxious to improve on this. Some of them are pressing harder than ever to earn an extra buck through improvement of incentive rates and better job classifications. This has led to restiveness in the form of slowdowns and strikes over incentive rates. Youngstown Sheet & Tube Co. has recently experienced a period of unrest over this issue in its blooming mill.

Industry contract negotiators have taken note of recent issues of *Steel Labor*, official publication of the United Steelworkers, which have devoted lead stories to the benefits of pensions and social insurance won through the strike of 1949. These observers believe the union's purpose is to remind the workers of their gains in this direction and to pave the way for further demands—possibly in November. Theme of these stories is that while the benefits are good they are still far from adequate.

No Capacity Revision

American Iron & Steel Institute will not revise rated capacity of the steel industry this summer as was done last year. This means that capacity officially will continue at 104,229,650 tons—rate set last Jan. 1.

Production this year has been running at approximately 104 annual ingot tons, although present weekly production is at the rate of 107 million tons. In the first 5 months, production was 43,614,000, and June production is expected to be about 9 million tons.

Find New Iron Ore Bed in Brazil

A new bed of South American high-grade iron ore has been discovered less than 125 miles from Sao Paulo in the Vale da Ribeira. An area also containing lead and zinc deposits has been found.

The new deposits may provide a more economical supply for steel mills because of nearness to important Brazilian industrial centers. Availability of the ore will depend on the exact location of the bed, which was not stated. Producers now bring in most of their ore from Minas Gerais.

Gear Backlog Swells to $20 Million

Brad Foote Gear Works, Chicago, has seen its backlog of orders swell from $400,000 to $20 million since July 1950. This has happened despite a constantly rising production rate and plant expansions. Of the backlog, $15 million is in government contracts and the balance for essential civilian industries. Fifty pct of current shipments are on war orders.

INDUSTRIAL SHORTS

New Construction—UNITED ENGINEERS & CONSTRUCTORS of Philadelphia will construct Detroit Edison's new St. Clair Power Plant to the St. Clair River.

Soaking Pit—The YOUNGSTOWN SHEET & TUBE CO. will have six new 3-hole soaking pits installed at the Indiana Harbor Works by the Rust Furnace Co., Pittsburgh.

Open District Office — The Wheelco Instruments Company has announced ENGINEERING PRODUCTS COMPANY as its district Agency for West Virginia.

Steel Firm Opens—The new corporation of EDGCOMB STEEL OF NEW ENGLAND, INC., has begun warehousing and distributing steel, brass and aluminum at Nashua, New Hampshire.

Sales Representative — THE VALE DO RIO DOCE AGENCY CO. has been named as sales representative for the Companhia Vale do Rio Doce, miners of Itabira Iron Ore, Brazil.

Tube Plant Moves—On July 1 UNIFORM TUBES, of Philadelphia, moves officially to its new plant at Collegeville, Pa.

Press Forging Installation—The world's largest press forging installation will go into the WYMAN-GORDON CO.'s North Grafton Plant in Mass., under the authority of the Air Materiel Command.

Changes Name — The former Platen Products Co has changed its name to PERIFLEX INC. No organizational changes, however.

Begin New Plant—A 50 pct increase in production is anticipated by NOX-RUST CHEMICAL CORP., of Chicago, on completion of their new plant.

Research Consolidated — The CALUMET AND HECLA CONSOLIDATED COPPER CO. has recently consolidated its research activities in a new building at Calumet, Mich. George Craig continues as director of research.

Buys Die Casting Plant—Purchase of the Glenvale Products Corporation, Detroit die casting plant, by UNIVERSAL DIE CASTING & MFG. CORP., of Saline, Mich., has been announced.

J & L Makes Appointment—The JONES & LAUGHLIN STEEL CORP. has announced the appointment of H. H. Wunderlich as assistant vice-president, General Services.

To Larger Plant—WEST POINT MANUFACTURING CO. has moved from its former location in Farmington, Mich., to a new and larger plant in Detroit.

Appoints Representatives—HYNES STEEL PRODUCTS CO. and its subsidiary, Roll Formed Products Co., Youngstown, have appointed Walter W. Scott representative in the southeastern Ohio area and Donald K. Shuck representative in the New York territory.

Services Added—Mr. S. Brown, at Montreal, and Jack Gray in Freeman, Ontario, have been placed by The NEILSON CHEMICAL CO. of Canada to offer more technical service in their respective areas.

Texas Distributor—Engineering Sales Co., of Dallas and Houston, has been named as representative for LATROBE ELECTRIC STEEL CO. in the Texas area.

Jet Engine Plant — Buick Div. will build a new plant for production of Wright J-65 SAPHIRE JET ENGINES north of Flint. An assembly plant will be erected in the Chicago area.

Expanded Pig Iron Production Urged at Malleable Founders' Meet

Continuing supply of merchant iron needed to meet defense production

Merchant iron producers and government agencies must recognize the need for an expansion in pig iron production for the foundry industry, Ralph T. Rycroft, president, Malleable Founders' Society, urged at the society's annual meeting at Hot Springs, Va.

"A continuing supply of merchant iron is an urgent requirement if the ferrous castings industry is going to meet the needs of the defense program," he warned.

Malleable iron castings are being produced at the highest rate in history, Mr. Rycroft reported.

Cal C. Chambers, president of Texas Foundries, Inc., Lufkin, Tex., was elected president of the society for the coming year. F. D. Brisse, president of the Laconia Malleable Iron Co., Laconia, N. H., was elected vice-president.

New directors are G. T. Boli, president of the Northern Malleable Iron Co., St. Paul, Minn.; R. N. Hoffman, vice-president of the Michigan Malleable Iron Co., Detroit, Mich.; W. H. Moriarty, vice-president in charge of sales, National Malleable and Steel Castings Co., Cleveland, Ohio, and Mr. Brisse. Society headquarters are in Cleveland.

Join Forces to Investigate Titanium Metal Producing Process

A new firm, Horizons Titanium Corp., has been formed to investigate a process to produce titanium less expensively than the present Kroll method which is now widely used in the industry. Though it has not been decided whether the new method will work commercially, it would be a continuous one and not a "batch" type.

Joining together to form the new firm are Horizons, Inc., of Cleveland and Princeton, N. J., and Ferro, Inc., also of Cleveland. Dr. Eugene Wainer, one of the organization's founders, was one

of the discoverers of titanates, electronic circuit components.

The new process which Dr. Wainer and his associates are developing may produce titanium more economically than the present method which yields titanium at about $5 a lb.

The Ferro interests are represented in the new group by C. D. Clawson, president of Ferro, and C. H. McIntyre, vice-president in charge of research. Edwin T. Goodridge represents Horizons, Inc., with Dr. Wainer.

To Install New Facilities At U. S. Steel's Fairless Works

Wean Engineering Co., Warren, Ohio, has been awarded contracts by U. S. Steel Corp. for a continuous strip pickling line, a continuous strip cleaning line, electrolytic tinning line and a combination temper mill and shear line for the new Fairless Works, Morrisville, Pa.

The high-speed pickling line will have the largest capacity of any similar unit in the world, according to Wean officials. The electrolytic tinning line, with auxiliary facilities, will be the major unit to produce tinplate at Fairless Works and is designed to handle coils weighing 30,000 lb.

Grant Funds for Chrome Mining

Lehman Bros., of New York, and the New Caledonia Co., has been granted an advance of up to $737,000 in Marshall Plan funds and the equivalent of $417,000 in counterpart funds to expand chrome mining in New Caledonia.

The money will be repaid in ore for the stockpile, most of which will be shipped during 1953.

NPA Plans Information Center

Plans to set up an "information center," for manufacturers with idle metalworking equipment, are being considered by the NPA. Officials at NPA feel that subcontracting to manufacturers with idle metalworking machines would be more satisfactory than increasing facilities of machine tool builders.

Steel Scrap Supply Needs Violent Upward Push

Scrap trouble this winter . . . Firms using steel must boost scrap flow . . . Nation's total scrap needs may be 37 million tons in '51 . . . Steelmaking needs rise—*By Ted Metaxas.*

Industry's steel backbone may become wobbly this winter if some openhearth fires gutter out for lack of scrap iron and steel. The scrap stream must be given a violent and voluntary upward push by the people who must have new steel and its products and are traditional scrap producers.

Publicity from NPA, steel men and scrap men blares out the need in support of the National Scrap Salvage Drive. America's total scrap needs are towering to about 37 million tons this year. Steelmaking will use about 22 million gross tons, or 2 million more than last year. Another burst of new capacity is due in 1952. Scrap stocks hover feebly at from a few days' supply to a week and heavy scrap to keep furnaces purring on fast schedules is scarcer.

Mills are propping up their operating rates by living on the winter scrap supply. Cold shoves some scrap sources into hibernation and hampers dealer preparation work. Scrap that is now going almost from freight car to furnace would ordinarily be fattening stockpiles for the lean months. Normal summer buildup of inventory has been abandoned.

Scrap collections must be maintained hard into winter to keep the melt rate from faltering. New capacity coming in will complicate matters. Metalworking plants must realize that they must protect their source of steel. They must appoint tough-souled men to go into dark factory corners and send obsolete machinery, jigs, fixtures, etc., into the scrap channels. America has a lot of dormant scrap but it needs gathering.

Clarify Defense Work

Scrap Drive publicity gives industry and farm a double motive to produce the scrap—patriotism and the menace to output. But farmers, metalworkers, railroads, and autowreckers should be purged of shortage fears as much as possible. They may be inclined to hold scrap material because of looming heavier shortages and defense work.

This calls for a clarification of the defense production picture—even on a tentative basis. Plants should be told that machine tool output will quicken and that holding on to obsolete wrecks may be a little foolish. Machine rebuilding capacity is also limited.

Auto wreckers could contribute more scrap but economics of the business makes it practical to withhold junked cars so that replacement parts can be sold over long stretches of time. With auto output sinking this tendency will heighten. Wreckers can only get a fraction for scrap as compared with parts.

No one expects wreckers to relinquish this lucrative parts market. But it may be more profitable for them to strip their cars of valuable parts they know will be

Scrap Use Skyrockets

Consumption of scrap iron and steel can do no less than keep up with the high steelmaking rate. Scrappies were told at a recent meeting that metal producers' '51 consumption of scrap has far outstripped use in 1950. The trend points up. Revised from an original estimate that 32.5 million tons would be used this year, total ferrous scrap consumption is now pegged at about 37 million tons.

Slipping mill scrap stockpiles show where steel plants have been getting some of their needs. At the beginning of January major mills could look up at stocks of around 50 days. Around April or May these sank to about 21 days. Now in some cases they are under a week.

in demand and free the bulk of the car for the scrap pile. Local scrap dealers may be able to work out some arrangements for this work.

Much ballyhoo has surrounded an accelerated program of scuttling ship bottoms for heavy scrap. A Maritime Commission committee is now trying to locate a few absolute wrecks. But don't expect too much from this source. The commission is not going to leave itself open to a Congressional left hook because it scrapped ships that may have to be rebuilt for war.

Assurances for Roads

Railroads need assurances that they will get enough new rolling stock, locomotives, and parts. They are wary now because NPA has been threatening their steel supply just when the 10,000-car-per-month car goal has been reached. Some roads are reportedly holding on to obsolete freight cars and are parking locomotives at sidings to form parts depots. Others are insisting that tubes and other critical parts of scrapped locomotives be returned. Give the roads commitments that they will get their parts and they will be in a position to release more scrap.

War needs for more crops and necessity of farm mechanization may force farmers into a holding position on old machines while trying to get new ones. Farmers should be reminded that machinery production is calculated to fill all their needs.

Civilian scrap drives have been sneered at as unworthy of the effort. But every ton is needed now and while it may not be feasible to collect kettles and tissue paper scrap it may be worthwhile to make a U. S. fund available to communities so they can finance uneconomical demolition work and other scrap-recovery jobs.

Even the scrap supply needed to get safely through summer may be dented by vacationing manufacturers who, unlike steel mills, are not pressed by abundance of materials and defense contracts to stay open.

Rags to Riches History of Phoenixville Mill

Phoenix Iron & Steel Co. beats odds to become successful Barium Steel subsidiary . . . Rebuilding transforms wreckage of yesteryear . . . Takes nimble brainwork—*By George Sullivan*

When the Phoenix Iron Co. closed its doors some 2 years ago most steel men, who knew the plant, would have given 10 to 1 it could never again be successfully operated. Today, as Pheonix Iron & Steel Co., Phoenixville, Pa., a subsidiary of Barium Steel Corp., it is rolling out 17,000 tons of structural shapes a month from steel made in its own rebuilt openhearths. When Barium bought it in September 1949 the wreckers were figuratively waiting at the gates with lighted torches; it is difficult to recognize in today's plant the grimy wreck of 22 months ago. Almost every motor had to be rebuilt, every main bearing replaced.

The changes took some money ($1.5 million in the past year), a lot of ingenuity and a tremendous amount of energy. The latter was supplied by Barium's board chairman, J. A. Sisto, who refuses to let impossible jobs stop him. When engineers wanted 2 weeks to draw plans for a road between two hitherto unconnected sections of the plant he staked out the road himself, had trucks rolling over it 2 days later. Of course he wasn't qualified to do this or any of the other jobs he has done—aside from working for Phoenix Bridge (now another subsidiary) as an apprentice in 1905, he had spent most of his adult life in Wall Street. He's done the same things in scores of other places, working out designs for a new type ingot stripper crane and various materials handling devices. Phoenix has just begun to make its own ingot molds in a 2-cupola foundry, is building a shape leveler for half the quoted price and 8 months shorter delivery.

Holds Open House

Last week, Phoenix and Barium's plate and fabricating subsidiary, Central Iron & Steel Co., at Harrisburg, Pa., held open house for important shareholders and for the business press. Central has been in the Barium family for more than 3 years, concentrating on plates and plate fabrication. It now makes such products as household boilers, large electric motor housings, dished heads, etc., and is considering going into line pipe fabrication. New equipment is still going in. A blooming mill was added last year, a 2½ in. plate shear is now being installed, another universal pipe mill is on hand and will be used if pipe fabrication is decided upon.

Like most openhearth shops today, neither of these plants has enough scrap on hand. But Central uses three cupolas to supply hot metal, and the company's Chester Furnace, Inc., has just begun to yield iron. Rated at 600 tons a day, the old Chester (Pa.) furnace was fairly well equipped during the war by the government to make ferroalloys. Later Standard Oil Co. (Indiana) bought it and put some $3.5 million into repairs, replacements and improvements. Barium bought the whole setup for $500,000 in 1949.

Don't Miss "Boron Steels"

Civilian production requiring alloy heat treated steel parts will have to depend on the new alternate boron steels. A series of technical articles on these new steels will start in next week's issue. It will be complete with latest information on heat treating, carburizing and machining characteristics of the new grades.

Case histories of application in gears, axles, springs and allied parts will be presented in detail. Experiences of the consumers who have the new steels in production and the hardenability information available on these actual applications will be cited.

Republic Gets First Liberian Ore

Ore averages 67 pct Fe with low impurities . . . Expect 1.5 million tons a year . . . Republic to get 2/3 of it—*By Bob Hatschek.*

ORE COMING: The *Simeon G. Reed* ready to be loaded with the first shipment of Liberian ore for U. S. furnaces. Early next year a fleet of 23,000 ton ore carriers of the Liberian Navigation Co., half owned by Republic Steel Corp., will take over the shipments from chartered vessels.

Late last week the first 10,000 tons of Liberian ore arrived at the Baltimore & Ohio Railroad ore pier in Baltimore. The arrival was the climax of a story begun in the mid-1930's when a Dutch geologist named Terpstra discovered a cliff of ore while prospecting for diamonds. The story continued with the personal initiative of a few men and the cooperation of two nations.

L. K. Christie, president of Liberia Mining Co., heard about the deposits while serving in the army, and has since trekked through the jungle many times to the deposit at Bomi Hills, 43 miles inland from Monrovia. Mr. Christie's push coupled with the cooperation of the Liberian government, which saw the benefits to that country of the new export, provided the spark plug to get the development underway.

About 67 Pct Iron

This shipment consists of ore averaging about 67 pct iron with some as high as 70 pct. Silica content of the hematite is quite low and neither phosphorous nor sulfur figure too highly in the analysis. The extremely high iron content of the ore is explained by the fact that it has been leached down by the weather and the cream lies at the foot of the cliff in lumps up to box car size. Ore of this high quality will be used directly in openhearths.

The mine is not yet on a full scale operational basis and as Mr. Christie put it, "This shipment is before the fact." It is hoped that mining can be brought up to a rate of a million and a half tons of ore a year by next February. One million tons annually is expected to be the absolute minimum. Of this total, Republic Steel Corp., which holds a good percentage of stock in the mining company, will get about two-thirds and the remainder will be sold on the open market.

Cost of getting the ore to Baltimore is expected to run at least $2 per ton less than any other foreign ore except that coming from Sweden. Total shipping distance is actually shorter than for some South American ore. The ore is shipped to port on a 43-mile railroad, the first in Liberia, where it will be loaded onto ships for the 3900-mile sea voyage to Baltimore.

From there the first shipment was loaded for delivery to Republic steel plants at Cleveland, Warren, Youngstown, Canton and Massillon. These plants are actually eager to get their hands on the new ore for pilot runs to determine its true worth. A pleasant surprise is likely.

The total extent of the ore is not yet known but drillings to a depth of 600 feet still indicate ore and numerous outcrops of hematite in the vicinity show that there is ore enough for generations to come. Prospecting to date has proven some 14 million tons of very high grade ore and many millions of tons of ore averaging 45 to 50 pct iron.

Advances in Metalworking Offer New Savings in Production

Savings in manpower and machine hours in production of ammunition by Army Ordnance and industry have been attributed to technical advances in metalworking, said Gen. Merle H. Davis, Chief, Ammunition Branch, Industrial Div.

It is now possible to produce large cartridge cases from steel which are superior to brass and will make substantial savings in copper and zinc. Certain new processes, Gen. Davis asserted, cut production costs in half.

The general disclosed that multiple rams are now being used with closed forming dies to produce breech rings, making possible an increase of 200 pct in ductility and 150 pct gain in impact. Other processes included a new trepanning technique used on gun tubes, and a technique for internal sizing and straightening short lengths of tubing.

Armco Electrical Sheets Patents

Armco Steel Corp., Middletown, Ohio, has granted Allegheny Ludlum Steel Corp, a license to use its patents covering processes used in the production of electrical sheets. The patents include improved methods for removal of carbon and the formation of a glass-like film on the sheet, and the application of inorganic coatings which provide improved electrical insulation.

Conversion Steel Sources Are Hiding Out

Tonnage available slips . . . Reluctance to pay high prices for conversion grows . . . Trend reversing, sheet rolling space more available . . . Emphasis now on bars—*By Gene Beaudet.*

Steel consumers depending on conversion steel to fill out their requirements are noticing a constant decrease in the tonnages obtainable through these intricate and high-priced channels. Conversion sources seem to be disappearing at a time when defense requirements are taking an ever increasing amount of finished steel output.

However, along with this decline is a growing reluctance on the part of many manufacturers to continue paying the high price of conversion. This may contribute to a future diminishing tempo of conversion activity.

Many factors enter into the changing conversion picture. The most important one is the increasing scarcity of ingot slabs and billets. About 6 months ago they were not too difficult to obtain. Lack of sufficient rolling space was the bottleneck then. The situation has tended to reverse itself and rolling space on sheet mills is generally more available. Conversion emphasis has shifted from sheet to bar steel.

Conversion Space Available

One large mill in the Chicago area has space available for sheet conversion for the first time in several years. This is due to the greater concentration on plate production to fill defense needs. Mills that were rolling 16 to 22-gage sheets are now putting steel into plates to satisfy freight car, ore boat, maritime, and other programs. Another mill has had so many cancellations from customers, unable to obtain ingots or semi-finished that their conversion business has practically dropped to nothing compared with 6 months ago.

There are several reasons for the diminishing supply of ingots. In some cases the scrap shortage has prevented ingot producers from making more than enough to take care of their own finishing requirements. One company has not sold any conversion ingots for several months because of the scarcity.

In other cases government directives are channeling ingots and semi-finished to other consumers and into different end-uses to meet defense demands. A Canadian source of conversion ingots has been ordered by its government to make its supply available to Canadian mills.

Steel that formerly came from foundries is being used by them to fill government orders such as those for freight cars and the petroleum industry. Furthermore some mills that had sold ingots for conversion have found it more profitable to put a larger proportion of their steel into finished products.

ALUMINUM: "Fairwater", topside covering for submarine's conning tower, radar equipment and other equipment, is made of aluminum. Sleek lines cut water resistance, add speed.

On the end-user side of the picture there seems to be a slight softening of demand. Automotive industry buyers are still in the market but are starting to dicker over price. One converter recently started to absorb part of the excess cost of ingots to keep a conversion customer happy.

Appliance people, already loaded with inventories, are said to be backing away from the market. A tank fabricator heavily loaded with defense orders switched from conversion to foreign steel for its civilian jobs because of the lower price. Those interested in conversion for speculative purposes have had their enthusiasm dampened by the pricing regulations.

Some manufacturers confronted with a price ceiling on their products are no longer able to pay the higher price and still make a good profit. A good part of the apathy on the part of conversion buyers is due to the imminence of the Controlled Materials Plan. Some think CMP will bring them more steel at much cheaper prices and are waiting to see what happens. If they are unable to make out under CMP some quarters think they will once more step up their efforts to buy conversion steel.

Survey Gas, Oil Needs

A survey of the gas and fuel oil requirements of the steel industry is being conducted by the Petroleum Administration for Defense in order to forestall shortages this winter.

Questionnaires are being sent to 223 steel companies concerning estimated needs over coming months. Steel mill needs will be higher than the new highs of last winter when some plants operated on short supplies.

Similar queries are being sent to oil and gas producers asking for past, current, and estimated increases in output.

Consumer Durables Move Nearer CMP Orbit

Basic metals use for hard goods under control . . . Output cutbacks deepened . . . Adds copper, aluminum end-use restrictions . . . Control put at firm assembling end product.

Use of steel, copper, and aluminum for manufacture of virtually all consumer durables has been placed under control, and production further limited by a new order, M-47A, superseding Dir. 1 to M-47.

This order brings consumer hard goods one step nearer CMP allocations. Forms will shortly start going out to producers of consumer durables for the filing of fourth quarter requirements.

What Order Does

The new order goes into effect as of July 1, along with CMP. The end-product producer's use will be specified either by a CMP allotment or by the classification of his product under the order. Among other things, the order:

(1) Adds copper and aluminum end-use limitations to those already existing for steel.

(2) Adds new products to list A (M-47) with permitted consumption set at 70 pct for steel, 60 pct for copper, and 50 pct for aluminum.

(3) Sets up a new list B for which consumption of metals will be permitted at a slightly higher rate, 85, 80, and 75 pct of permitted use during first quarter, 1951.

(4) Lifts the ban on use of copper and aluminum for production of numerous end items—although still banning their use for ornamental items and purposes.

(5) Transfers the point of control of copper and aluminum from the fabricator to the firm which produces or assembles the end product.

This latter action, NPA said, was taken because under control at fabrication levels the larger firms were able to get more than their share of the two metals.

Producers who receive allotments of CMP materials are restricted to the amounts of those allotments and may not go into the free market for additional supplies. Also, they cannot choose to ignore the allotment in favor of chances on the free market.

Copper and aluminum users—but not steel—may shift usage of permitted totals to increase output of one product at expense of another if the two are on the same list—that is, quantities may not be shifted from A to B items.

Industry Controls This Week:

NPA Orders

M-47A, superseding Dir. 1, to M-47—Adds end-use limitations, new products, and further restrictions (see p. 120 for details). Eff. July 1, 1951.

Reg. 6, Construction—Brings industry under CMP outlining steps for filing CMP-4C. Most structural steel shapes are classified.

OPS Orders

CPR 46—Orders rollback of copper and brass scrap prices. Eff. June 26, 1951. (See P. 120 for details.)

CPR 47—Orders rollback of brass mill scrap prices. Eff. June 26, 1951 (see p. 120 for details).

CPR 22 and 30, amend—Provides new methods to determine materials cost, permits inclusion of unemployment insurance in labor costs.

Issue New Priority Rating Affecting Ship Repair Operators

NPA has issued Order M-70, which authorizes a new priority rating (DO-91P) which ship operators, marine suppliers, and ship repair yards may use during third quarter to obtain MRO materials.

It also authorizes marine suppliers to use the rating to build up inventories to 120 pct of fourth quarter 1950. It further provides for use of the rating by ship-repair yards for building up to the 120 pct level their inventories of materials other than steel, copper, and aluminum.

Operators of domestic vessels are permitted to substitute first quarter 1951 as a base eriod. Procedure has been set up for use of the rating by foreign vessels.

Contracts to Production Pools

In what was described as a move to help small business, the Labor Dept. on June 19 lifted the provision of the Walsh-Healy act which requires that government contracts go only to manufacturers or regular dealers.

This action, said Secretary Tobin, will permit contracts to be awarded directly to associations or pools formed by manufacturers who, individually, could normally only take part of a job.

OPS Advises Filing of Price Forms

Manufacturers of refractories are advised by OPS to file pricing forms, required by CPR 22, before July 2. Despite trade rumors, no specific pricing order for the refractories will be issued before July 2, OPS officials state.

Order for Construction Industry

CMP Reg. 6 has been issued by NPA permitting the construction industry to come under CMP.

The order spells out the steps for filing CMP-4C for contractors to get schedules and allotments of CMP materials and "A" products. Under the definition of "A" products, most structural steels shapes are classified.

Order M-4 remains in effect and will be used as criteria in processing applications under CMP-6.

Amend Price Orders on Many Items

OPS has amended its price orders covering many manufactured goods (CPR 22) and machinery (CPR 30) to provide new methods of determining materials costs and to permit unemployment insurance payments to be included in labor cost calculations.

Items added to CPR 30 are ships, coke-oven doors and jambs,

2 STEPS
to stepped-up handling

1. Use durable and dependable trucks. *Battery* trucks are a profitable investment: their electric drives start smoothly, have few wearing parts, use no explosive fuel, run without warm-ups or tune-ups. *They run with a minimum of down-time!*

★

2. Equip them with trouble-free batteries . . . the kind that take temperature extremes, jars, jolts and accidents as part of the day's routine. All of which is another way of saying: use EDISON Batteries . . . The Standard of Comparison for the Industry.

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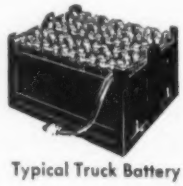
For this kind of duty, EDISON cells have no equal. They're built of steel inside and out, and their electrolyte preserves steel. They are not injured by accidental short-circuiting or reverse charging. Case histories show that many of them which have fallen off docks or down elevator shafts, or been in fires and floods, are still hard at work today!

For full information, write today for free booklet SB 2039 and a current price quotation. You'll find EDISONS cost little more than other makes of batteries . . . and they pay this back over and over in terms of low upkeep and long, long life. *Edison Storage Battery Division of Thomas A. Edison, Incorporated, West Orange, New Jersey. In Canada, International Equipment Company, Ltd., Montreal and Toronto.*

EDISON
Nickel · Iron · Alkaline
STORAGE BATTERIES


Typical Truck Battery

LOOKING FOR SUBCONTRACTORS?

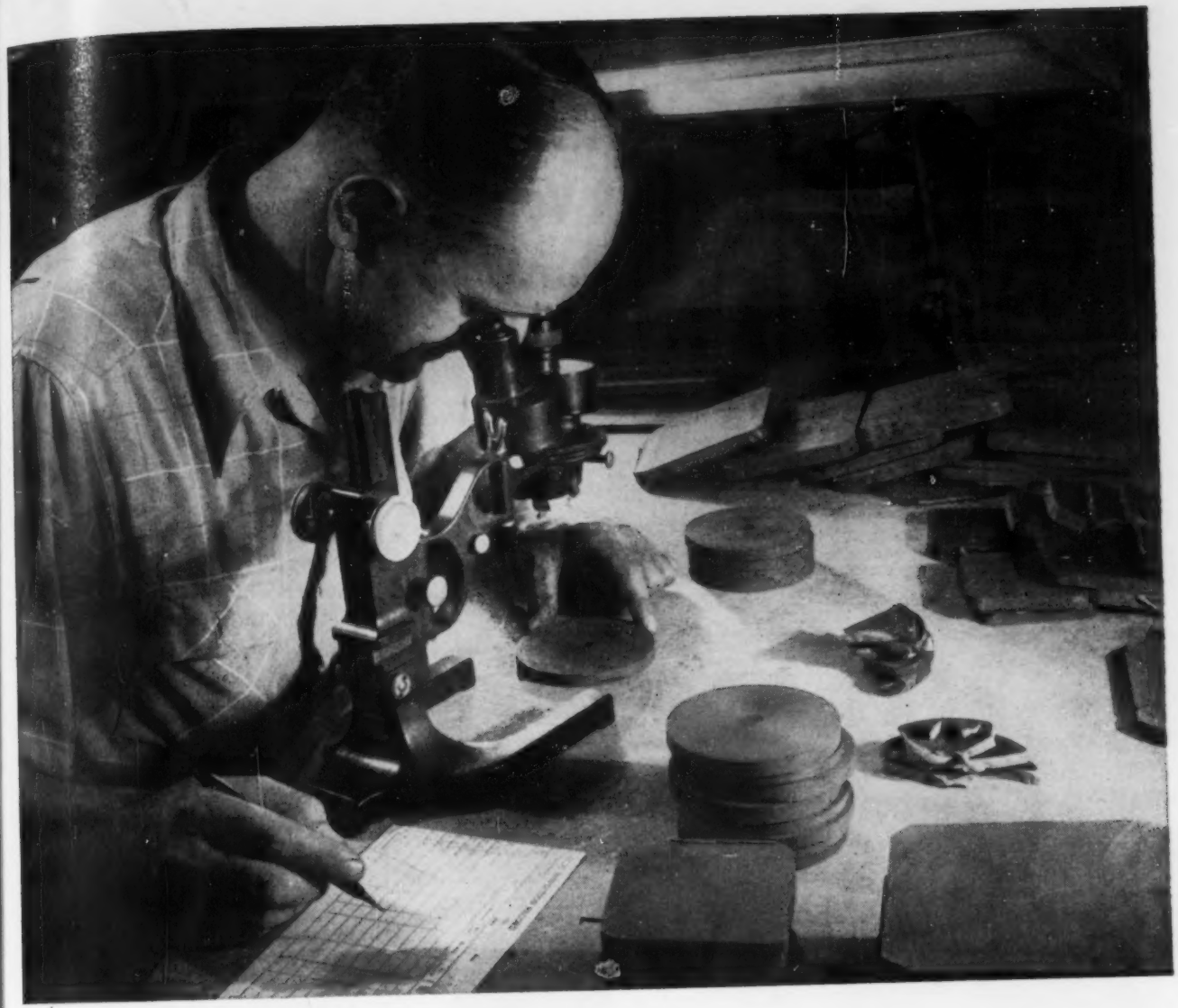
You'll find many subcontractors in the advertising pages of The Iron Age. And, on page 147 of this issue is CONTRACT MANUFACTURING, a directory of specialized production services.

and fabricated track-work. Parts and subassemblies, not specifically listed in the regulation, are now covered if they can be used only in commodities regulated by CPR 30. Castings still are not included, however.

DEFENSE CONTRACTS

Week of June 25, 1951

Surface grinders—Lloyd and Arms, Inc., Philadelphia
Screw machines—Brown & Sharpe Mfg. Co., Providence.
Spare parts—Blood Bros. Machine Co., Ohio Auto Parts, Columbus, Ohio
Press, hydraulic—Hydropress, Inc., New York
Milling machines—Kearney and Trecker Corp., Milwaukee
Machine grinders—Mattison Machine Works, Rockford, Ill.
Cannon parts—Schenectady Machine and Tool Co., Schenectady, N. Y.
Communication equipment—General Electric Co., Syracuse
Cranes—Reiger Equipment Co., Inc., Urichsville, Ohio
Pump parts—Worthington Pump and Machy. Co., Harrison, N. J.
Compressor parts — Champion Pneumatic Machy. Co., Princeton, Ill.
Truck parts—Lipe Rollway Corp., Syracuse, N. Y.
Trailer parts—Rockwell Mfg. Co., Pittsburgh, Pa.
Machy. and equipment—Thompson Products, Inc., Cleveland
Aircraft parts—Boeing Airplane Co., Seattle
Engines—American Airmotive Corp., Miami Springs, Fla.
Engines—Kindred Aviation Corp., Burbank, Calif.
Indicators—Bendix Aviation Corp., Teterboro, N. J.
Engine parts—Allison Div., GMC, Indianapolis, Ind.
Pump parts — Pesco Products Div., Bedford, Ohio
Engine components — Avco Corp., Stratford, Conn.
Machy. and equipment—Easy Washing Machine Co., Syracuse
Machy. and equipment—Utica Drop Forge and Tool Corp., Utica, N. Y.
Machy. equipment—Bill Jack Scientific Instrument Co., Solana Beach, Calif.
Turbo-jet engine assy. — GMC, Indianapolis, Ind.
Spare parts — Borg Warner Corp., Bedford, Ohio
Milling machines — Kearney and Trecker Corp., Milwaukee
Lathes—South Bend Lathe Works, South Bend, Indiana
Trimming Press—E. W. Bliss Co., Canton, Ohio
Grinders—Albertson and Co., Inc., Sioux City, Iowa
Machines, gear grinding—The Gear Grinding Machine Co., Detroit
Presses, cutters—Harris-Seybold Co., Washington, D. C.
Machines, grinding—Cincinnati Milling and Grinding Machines, Inc., Cincinnati
Machines, cutting—Gould and Eberhardt, Inc., Irvington, N. J.
Machines, milling — Cincinnati Milling and Grinding Machines, Inc., Cincinnati



The One "Alloy" That Has No Price Tag

It isn't for sale. Yet its presence in the tool and die steel you use can mean definite increases in output per grind, fewer hardening hazards, and less die failures.

This "alloy" originated in Carpenter Mills years ago. It was born in response to a wide demand for tool steels that guarantee unvarying uniformity, and dependability above the ordinary. Actually, the fellows in the Mill call it an alloy made of *human* elements. Elements like patience, care, and skill backed by exclusive quality controls and the most modern equipment science can devise.

As a result, users of Matched Tool and Die Steels will tell you it's hard to realize the feeling of *confidence* and *safety* you get with each bar labeled "Carpenter"—unless you try it. And the trying has been simplified beyond anything known. It starts with an exclusive, *proved* method of selection that reduces "cutting and trying"—and follows-through with complete working instructions and personal assistance.

Acid Disc Inspection—One of many Carpenter quality controls that packs greater safety and dependability into each bar you use. Your assurance that every bar is clean, uniform, free from all defects.

Begin *now* to get more production from present equipment . . . ask your Carpenter representative for this new 189-page Carpenter Matched Tool & Die Steel Manual.

The Carpenter Steel Company, 121 W. Bern St., Reading, Pa.
Export Department: Carpenter Steel Co., Reading, Pa.—"CARSTEELCO"

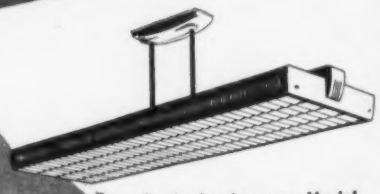
Carpenter

MATCHED TOOL & DIE STEELS

—containing the one "alloy" that has no price tag!

To get started now, just call Carpenter. Warehouse stocks in principal cities throughout the country.

Light Production Costs on Heavy Volume of Light Fixtures



Curtis Anniversary Model 51-CLH

At Curtis Lighting, Inc., Chicago, this 250-ton Clearing press produces louvers up to four feet long for fluorescent lighting fixtures. It hasn't been out of service a single minute in three years of steady two-shift operation. With two men working the three station dies, the press blanks, perforates and forms 68 complete louvers per hour.

Steady, top tempo production without interruption is the secret of real economy, and Curtis Lighting, Inc., chose Clearing because they knew it was the way to hold down costs. With something like 12,000 service hours delivered and the first minute of press down-time still uncharged, it seems they made a wise choice. If you want that kind of production economy in your plant, get in touch with Clearing.

CLEARING MACHINE CORPORATION

6499 WEST 65TH STREET • CHICAGO 38, ILLINOIS

CMC CLEARING

CLEARING PRESSES

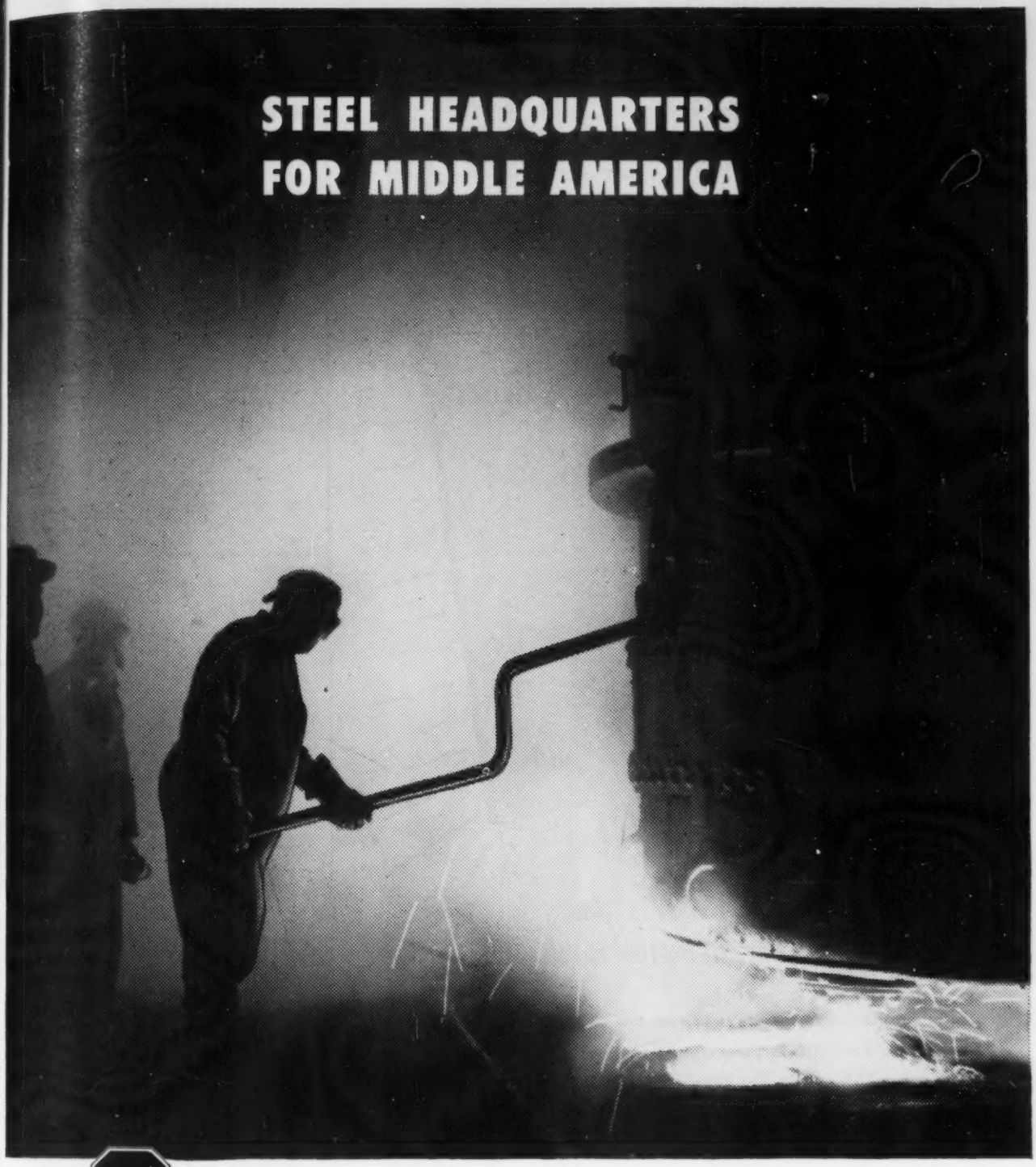
THE WAY TO EFFICIENT MASS PRODUCTION

BITS AND BRIEFS

By Bill Packard

The Engineering Manpower Commission is worried about the draft drain on the pool of engineers. It has urged the Dept. of Defense to make certain engineers aren't assigned to KP or to other unskilled occupations . . . **Scrap men have upped their sights on the amount of purchased scrap steel and iron to be used this year. Now the figure is around 37 million tons. Needs next year sadden even the most optimistic** . . . Fast tax write-off privileges to manufacturers have had inflationary effects on the used machinery market. Those firms with certificates have been bidding up prices desperately, getting ready for war work . . . Asking to be put on the OPS mailing list is a kiss of death to clerk mail-openers. After 2 months, one publication hit the mailing list twice. It received 12 copies of a Mike DiSalle speech. Enterprising junk paper collectors could make a fortune . . . **Women may have the right to point an accusing finger at the metals shortage if they start bulging at the wrong places. The Corset & Brassiere Assn. noted that metals were tight and its products may suffer later. The truth about figures will be evident in that case** . . . If you hop a plane immediately on reading this you may make it. Surplus equipment in two Navy Industrial Reserve Facility buildings will be sold at a public sale on Friday, June 29. Site is Columbus, Ohio. Sale starts at 10 a.m., standard time . . . Daystrom, Inc., has put its case before its employees in a booklet explaining personnel policies during the emergency. They sound good . . . **Philco's home radio and television production will be curtailed as employees are given vacations. Philco explains that it must balance inventory with sales** . . . The American Institute of Electrical Engineers' Benjamin G. Lamme gold medal went to Donald I. Bohn, chief electrical engineer of Aluminum Co. of America.

STEEL HEADQUARTERS FOR MIDDLE AMERICA



SINCE GRANITE CITY STEEL 1878

Middle America, backbone of the nation, gets part of its strength from Granite City Steel's modern mills. Since 1878, Granite City Steel has been the main supplier of quality steel for Middle America. And today we continue to keep pace with Progress . . . continue to be Steel Headquarters for Middle America.

OUR PRODUCTS

Ingots • Cold Rolled Coils • Strongbarn Galvanized Roofing and Siding (Patented) Cold Rolled Sheets • Electrical Sheets Tin Mill Products • Electrolytic Tin Plate Porcelain Enameling Sheets • Fabricated Products • Hi-Strength Corruform

GENERAL OFFICE and PLANT

Granite City, Illinois

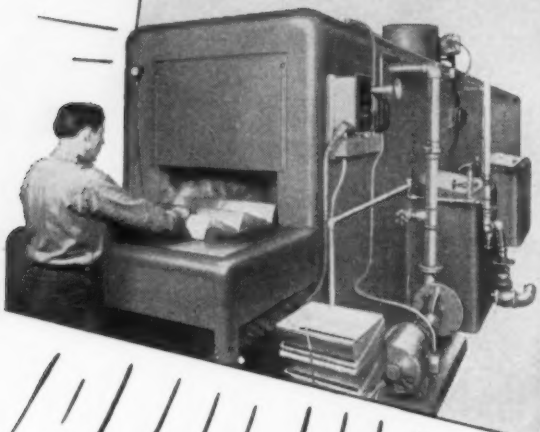
DISTRICT SALES OFFICES:

Dallas, Texas
Kansas City, Missouri
Memphis, Tennessee
Minneapolis, Minnesota
St. Louis, Missouri

GRANITE CITY STEEL COMPANY, Granite City, Illinois

Metal Finishing Specialists

use Cincinnati machines



. . . report "50% saved in time and labor . . . with better results!"

Where production constantly varies . . . small and large parts . . . castings and stampings . . . with grease, oil and chips to be removed . . . an efficient cleaning machine is a necessity. Proved in service, this Cincinnati Cleaning Machine is used for phosphate cleaning, chromic acid rinsing and drying an indescribable variety of parts in the well known metal finishing plant of Jukes & Shafer, Inc., Chicago.

If you want comparable results . . . time and labor savings plus better performance . . . investigate Cincinnati Cleaning Machines. Write today for free up-to-date catalog.

Cincinnati

CLEANING AND FINISHING MACHINERY COMPANY
313 HECLA STREET, IRONTON, OHIO

STEEL CONSTRUCTION NEWS

Fabricated steel awards this week included the following:

325 **Tons,** Chicago, approaches to Congress Street expressway, to Wendnagel and Co.

300 **Tons,** Janesville, Wis., plant addition to Parker Pen Co., to Wisconsin Bridge and Iron Co.

140 **Tons,** Beaumont Texas, (galvanized structural steel) for switchyards of Gulf States Utilities Co. through Stone and Webster Engineering Corp., Inc., Boston Mass., to Muskogee Iron Works, Muskogee Oklahoma.

Reinforcing bar awards this week included the following:

210 **Tons,** Vandalia, Ohio, arrow products superstructure, to U. S. Steel Supply Corp.

205 **Tons** Hobart, Ind., sewage treatment plant div. 3, to Joseph T. Ryerson and Son.

130 **Tons,** Chicago, mess hall and administration bldg., O'Hare Field, to Truscon Steel Co.

110 **Tons,** Urbana, Ill., men's hall addition to Bethlehem Steel Corp.

Reinforcing bar inquiries this week included the following:

980 **Tons,** Montgomery, Pa., highway construction, Pennsylvania State Highway & Bridge Authority. Bids due July 27.

750 **Tons,** Terre Haute, Ind., New Wabash River station units 3 and 4.

700 **Tons,** Lafayette, Ind., Ely Lilly and Co.

690 **Tons,** Westville, Ind., Memorial.

590 **Tons,** Fort Campbell, storage igloos U. S. Government.

240 **Tons, Chicago,** bachelor officers quarters O'Hare Field.

180 **Tons,** Chicago, Mentally Sick Childrens Institute of Research.

170 **Tons,** Windsor Conn., 4 span plate girder bridge and approaches of bituminous macadam. E. B. Burdick, Hartford, Conn., district engineer.

140 **Tons,** Mt. Vernon, Ohio, water works.

130 **Tons,** Chicago, St. Francis Borgia school.

130 **Tons,** White Bear, Minn., bridge.

Fabricated steel inquiries this week included the following:

18,000 **Tons,** Missouri River improvements. transmission towers for Bureau of Reclamation spec. D5-3391. American Bridge Co., low bidder.

7000 **Tons,** Missouri River improvements, transmission towers for Bureau of Reclamation spec. D5-3392. Bethlehem Steel Co., low bidder.

3200 **Tons,** Campion, Colo., pen stocks for Bureau of Reclamation.

2685 **Tons,** Chicago, Congress Street bascule bridge.

2069 **Tons,** Montgomery, Pa., highway contruction, Pennsylvania State Highway & Bridge Authority. Bids due July 27.

1600 **Tons,** Lake Andes, S. D., power house, U. S. Engineers office, Omaha.

675 **Tons,** Windsor Conn., 4 span plate girder bridge and approaches of bituminous macadam. E. B. Burdick, Hartford Conn., district engineer.

475 **Tons,** Joliet, Ill., space mitre gates for Corps. of Engineers.

Home Construction Activity Off

With only 88,000 units started in April, the nation's home-building activity fell to the lowest point in 4 years.

However, the 4-month total of 347,000 new units indicates a probable construction of a million units during 1951, some 200,000 more than planned by the U. S.

Loyalty Test is given every Bristol Brass alloy, to make sure it is faithful both to customers' specifications and to Bristol's frankly fussy ideas on quality. Here, in Bristol's modern laboratories, a platinum screen covered with electro-deposited copper is weighed to determine copper-content of a test piece. And here, *many* eyes watch constantly to see that all sheet, rod and wire going out of this mill is made truly "Bristol-Fashion." The Bristol Brass Corporation, since 1850 in Bristol, Conn. Offices or warehouses in Boston, Chicago, Cleveland, Dayton, Detroit, Los Angeles, Milwaukee, New York, Philadelphia, Pittsburgh, Providence, Rochester.

"Bristol-Fashion" means Brass at its Best

An economical source of hydrogen

DU PONT "NATIONAL"

Anhydrous Ammonia

IN CYLINDERS

Minimum 99.99% ammonia...YET IT COSTS NO MORE!
Every cylinder is tested!

For your inert atmospheres in metal treating—whether it's for bright annealing, nitriding, brazing, normalizing or sintering—dissociate Du Pont "National" cylinder ammonia. It is minimum 99.99% ammonia. You get it at no extra cost! Du Pont "National" is always dry—moisture content is less than 50 parts per million. What's more, it's readily available. Distributors and stock points are located across the country to assure you of fast delivery.

Do you know these other Du Pont chemicals for metal treating?

HYDROXYACETIC ACID 70%—For bright dipping of copper, electro-polishing of stainless steel and electroless plating of nickel.

METHANOL—Source of hydrogen and carbon monoxide for an efficient reducing atmosphere in many metallurgical operations, and for cleaning of metal parts during fabrication.

Product information on these and other chemicals is available. Please write on your letterhead to: E. I. du Pont de Nemours & Co. (Inc.), Polychemicals Department, Wilmington 98, Delaware.

DU PONT
REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY

POLYCHEMICALS DEPARTMENT

350 Fifth Avenue, New York 1, N. Y. 7 S. Dearborn Street, Chicago 3, Ill.
818 Olive Street, St. Louis 1, Missouri

new equipment

Continued from Page 38

Six-inch projection lens

A five-magnification projection lens with a 6-in. aperture and a 12-in. focal clearance has been perfected for Jones & Lamson optical comparators. With this lens the contour of any object that will fall within a 6-in. circle can be projected in its entirety onto the 30-in. receiving screen for measurement or direct comparison, with extreme accuracy or outline. The large aperture permits direct overall inspection of a wide variety of relatively large objects. *Jones & Lamson Machine Co.*

For more data insert No. 13 on postcard, p. 35.

Rust-inhibiting wrapper

Vapor wrappers are special wrapping papers impregnated with Calex, a chemical that prevents rusting by chemically rendering moisture non-corrosive. Use of this treated paper in packaging iron and steel products eliminates the double task of applying and later removing protective coatings. *Nox-Rust Chemical Corp.*

For more data insert No. 14 on postcard, p. 35.

Dry chemical extinguisher

A 4-lb dry chemical fire extinguisher with a rubber hose offers the advantages of ease of operation, flexibility in fighting overhead and ground-level fires, and maximum extinguishing effectiveness for inexperienced operators. Dry chemical is ejected through a self-closing nozzle that produces a fan shaped stream pattern, with operating range of 12 to 15 ft. When fully charged, the unit weighs 10½ lb. *Ansul Chemical Co.*

For more data insert No. 15 on postcard, p. 35.

Resume Your Reading on Page 39

Sheet Mills
of about
50 Years Ago

United 6 Stand, 4-High Tandem Hot Mill

50 YEARS AGO

The Old Grey Mare Was Queen of the Highways

DEVELOPMENT of mass production methods in the manufacture of automobiles brought a new era of progress to America. Paved road construction paced new car production . . . farmers were rescued from isolation . . . remote and inaccessible areas were opened for development . . . new industries were born, commerce increased, living standards raised to new, high levels.

Without steel, and the machinery for rolling and forming it, mass production of the automobile and the progress attending it, would have scarcely been possible.

For what United has been able to contribute to better steel rolling processes, we are deeply grateful. It is our hope that we may continue to serve the industry as well in the years to come as we have so earnestly tried to serve it in the past.

Golden Anniversary
1901 UEFCO 1951

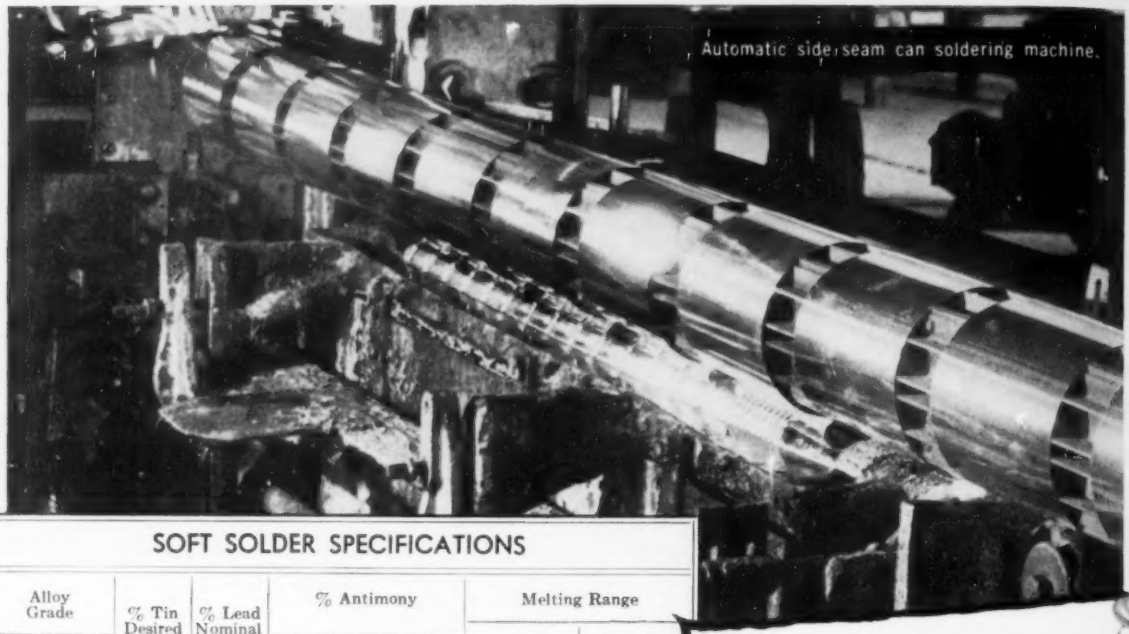
UNITED

ENGINEERING AND FOUNDRY COMPANY

Pittsburgh 22, Pennsylvania

Plants at PITTSBURGH • VANDERGRIFT • NEW CASTLE • YOUNGSTOWN • CANTON

Subsidiaries: ADAMSON UNITED COMPANY, AKRON, OHIO • LOBDELL UNITED COMPANY, WILMINGTON, DELAWARE • STEDMAN FOUNDRY AND MACHINE CO., INC., AURORA, INDIANA



Automatic side seam can soldering machine.

SOFT SOLDER SPECIFICATIONS

Alloy Grade		% Tin Desired	% Lead Nominal	% Antimony			Melting Range			
							Solidus		Liquidus	
SAE	ASTM			Min.	Desired	Max.	°F	°C	°F	°C
	70A	70	30	—	—	0.12	361	183	378	192
	70B	70	30	—	—	0.50				
	60A	60	40	—	—	0.12	361	183	374	190
	60B	60	40	—	—	0.50				
	50A	50	50	—	—	0.12	361	183	421	216
	50B	50	50	—	—	0.50				
	45A	45	55	—	—	0.12	361	183	441	227
1A	45B	45	55	—	—	0.50	361	183	414	212
1B	—	43	57	1.5	—	2.00	361	183	405	208
	40A	40	60	—	—	0.12	361	183	460	238
2A	40B	40	60	—	—	0.50	361	183	460	238
	40C	40	58	1.8	2.0	2.4	365	185	448	231
2B	—	38	62	1.5	—	2.0	361	183	450	232
	35A	35	65	—	—	0.25	361	183	477	247
	35B	35	65	—	—	0.50				
	35C	35	63.2	1.6	1.8	2.0	365	185	470	243
	30A	30	70	—	—	0.25	361	183	491	255
3A	30B	30	70	—	—	0.50	361	183	494	257
	30C	30	68.4	1.4	1.6	1.8	364	185	482	250
3B	—	28	72	1.5	—	2.0	361	183	484	251
	25A	25	75	—	—	0.25	361	183	511	266
4A	25B	25	75	—	—	0.50	361	183	511	266
4B	—	25	75	1.25	—	1.75	361	183	502	261
	25C	25	73.7	1.1	1.3	1.5	364	184	504	263
5A	20B	20	80	—	—	0.50	361	183	531	277
5B	—	20	80	1.25	—	1.75	361	183	518	270
	20C	20	79	0.8	1.0	1.02	363	184	517	270
6A	15B	15	85	—	—	0.50	361	183	550	288
6B	—	15	85	—	—	2.75	361	183	537	280
	10B	10	90	—	—	0.50	514	268	570	299
	5A	5[d]	95	—	—	0.12	574	301	594	312
	5B	5[d]	95	—	—	0.50	554	290	588	309
	2A	2[e]	98	—	—	0.12	603	318	610	321
	2B	2[e]	98	—	—	0.50	581	305	603	317
	2.5S*	[f]	97.5	—	—	0.40	579	304	579	304
	1.5S**	1[g]	97.5	—	—	0.40	588	309	588	309

* Silver 2.3 to 2.7
** Silver 1.3 to 1.7

For elements other than those mentioned in the table, the maximum content in the alloy shall be as follows:

Bismuth		0.25 per cent
Copper	Alloy grades 70A to 2B, incl	0.08 per cent
	Alloy grades 2.5S and 1.5S	0.3 per cent
Iron		0.02 per cent
Aluminum, Zinc	each shall not exceed 0.005 per cent when determined on a 10-g sample	

Analysis shall regularly be made only for the elements specifically mentioned in the above table. If, however, the presence of other elements is suspected, or indicated in the course of routine analysis, further analysis shall be made to determine that the total of these other elements is not in excess of 0.08 per cent.

The chemical requirements of S.A.E. Specifications Nos. 1A, 2A, 2B, 3A, 3B, 4A, 4B, 5A, 5B, 6A, and E-07 conform substantially to the requirements for alloy grade Nos. 45B, 40B, 40C, 30B, 30C, 25B, 25C, 20B, 20C, 15B, and 2.5S, respectively.

[d] Permissible tin range, 4.5 to 5.5 per cent.
[e] Permissible tin range, 1.5 to 2.5 per cent.
[f] Tin maximum, 0.25 per cent.
[g] Permissible tin range, 0.75 to 1.25 per cent.

SOLDER

one of Nature's enigmas

Here is a combination of metals — usually lead and tin — possessing properties foreign to the parent metals themselves. For example, if one tried to solder the seams of a tin can with pure lead or tin, the tin coating would melt off the can. Yet these two metals, alloyed as they commonly are in soft solders, actually melt at a much lower temperature than either one of them alone. This peculiar result of the marriage of lead and tin makes it possible to join metals at temperatures low enough to prevent any change in their characteristics. The soft solders are nearly always alloys of lead and tin with some of them containing small amounts of silver. Low melting point, plus the equally important fact that they readily adhere to other metal surfaces are the primary reasons for the extensive use of soft solders.

The largest single use of solder is in the manufacture of tin plate containers. The side seams and, frequently, the bottoms and tops of cans are soldered to prevent leakage. Large tonnages of solder are used in the production of automobile radiators, in plumbing, for joining metals in electrical appliances and in a multitude of other ways. An interesting sidelight on the importance of solder is the fact that ENIAC (Electronic Numerical Integrating And Calculating Machine), the giant electric brain, solves the intricate problems fed to it with the help of over two million soldered connections. Fusible alloys with particularly low melting points — some even lower than the boiling point of water — are chiefly used in automatic safety devices of which sprinkler heads in fire-extinguishing systems and electric fuses are good examples.

In view of the innumerable ways in which solder serves industry, it is not surprising that more than 95,000 tons of lead have been used for this purpose in a single year.

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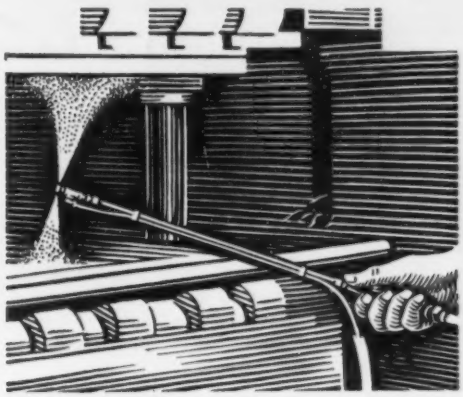

"Dag" colloidal graphite dispersed in water eliminates smoke and fumes in hot forging operations . . . greatly improves working conditions. The lubricating properties of colloidal graphite are superior, too, giving increased production . . . reduced die wear . . . better finish . . . and usually a saving in steel stock.

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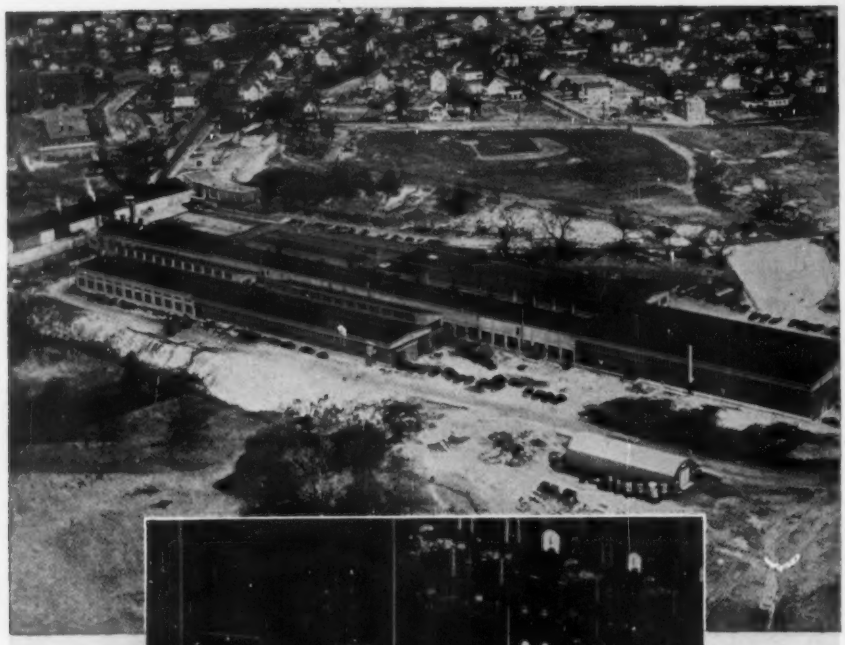

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publications

Continued from Page 35

drawings of two standard Pangborn machines for this process. Engineering specifications give dimensions, plan and front elevations, gun and work capacities, and descriptions of these units. *Pangborn Corp.*

For free copy insert No. 20 on postcard, p. 35.

Softener

Lower operating costs through use of Permutit Zeolite softener are the subject of a 4-p. folder. Pictures and schematic drawings are used to illustrate typical applications of the hot process softener. Use of the method enables delivery of water of zero hardness. *The Permutit Co.*

For free copy insert No. 21 on postcard, p. 35.

Quick reading scale

A quick reading scale that speeds weighing operations and minimizes weight errors is described in a new 4-p. bulletin. The model 77 Weightograph is a beam type scale brought up to date with novel engineering. Figures and graduations on the illuminated chart are magnified about 40 times for quick, accurate reading. *The Howe Scale Co.*

For free copy insert No. 22 on postcard, p. 35.

Rolling doors

Kinnear rolling doors are described in a new 32-p. catalog containing up-to-date information on interlocking steel-slat rolling doors for both service and fire protection purposes. Doors are designed and engineered for maximum efficiency with minimum use of metal in essential hardware. *Kinnear Mfg. Co.*

For free copy insert No. 23 on postcard, p. 35.

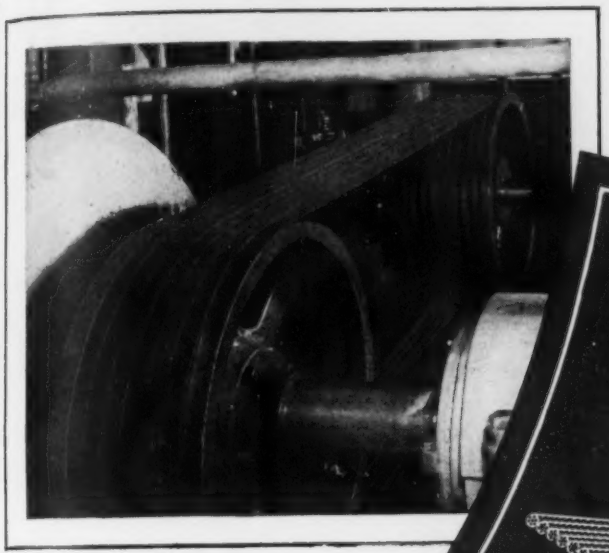
Metal stampings

A method of economizing on die costs for metal stampings is described in a 40-p. booklet. The Williams Universal die system is explained in detail. Typical die sets, drill jigs and other widely used tools are discussed. *Connecticut Tool & Engineering Co.*

For free copy insert No. 24 on postcard, p. 35.

Resume Your Reading on Page 36

How to trim the "fat" from a V-Belt drive



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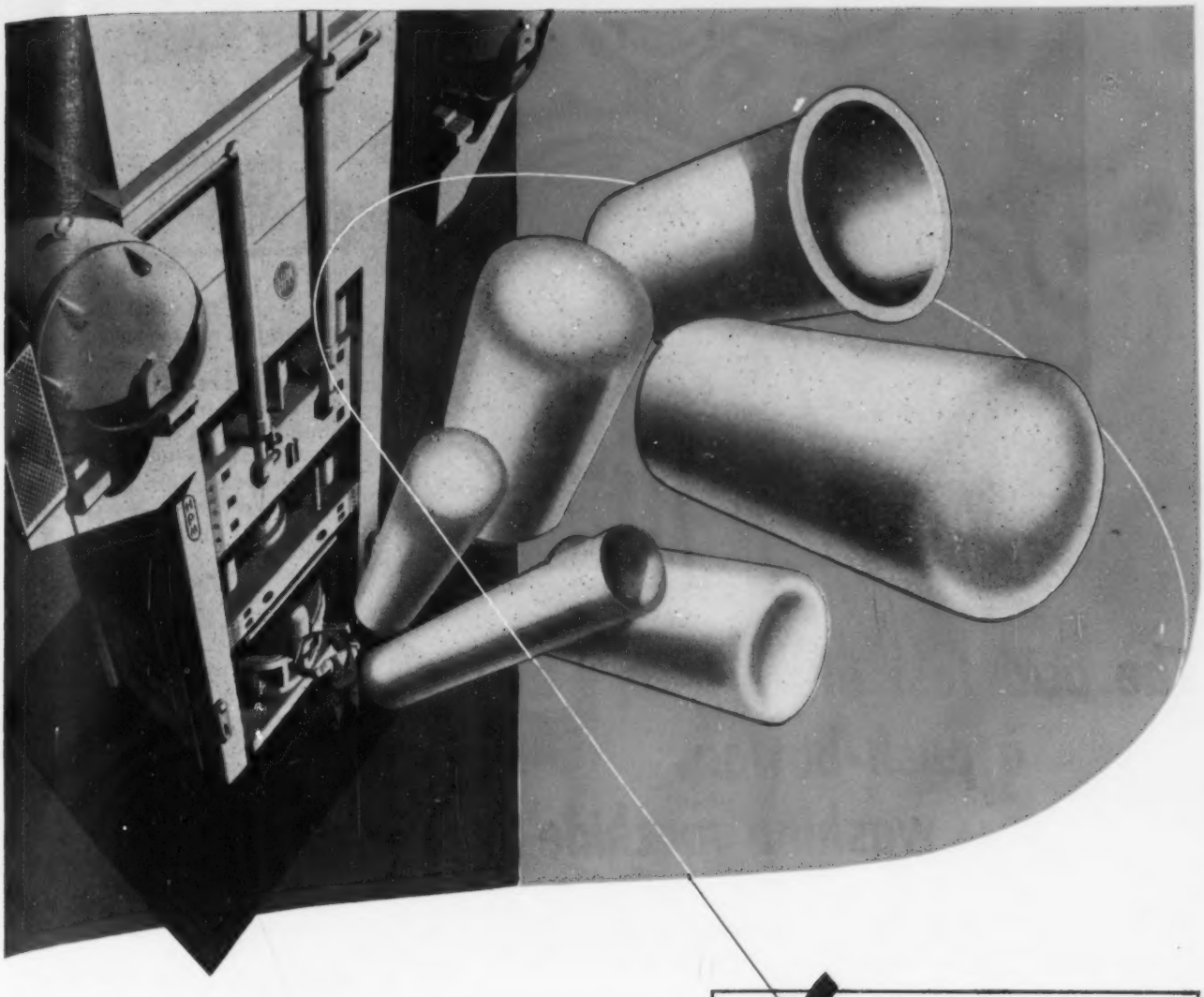

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Here is a modern, proven method of making deep-drawn shapes that avoids conditions that produce thin, weak wall sections, or thick, heavy sections. Wall thicknesses produced by the Scaife method are uniform throughout the entire length of the draw.

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We will be glad to have your inquiries regarding deep-drawn shapes up to 36 inches in diameter and ¼-inch wall thickness.

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A continuation of this pressing operation turns the cup "inside out" without removing it from the dies—

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Scaife Company

Founded 1802

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A rolling, tumbling action would assure thorough cleaning of each piece. The process would be faster and more effective . . . yet would require less employee time.

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Here was need for a material that would neither be eaten away by the pickling acid, nor affected by the hot and cold water sprays. This metal would have to stand the tumbling of sharp-edged pieces over the ribs of the basket as it revolved.

There would be strain, too, from the off-center load, because the basket turns on a tilted pivot. Fabrication would be important—a sound welding job essential.

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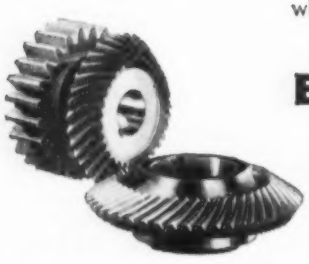

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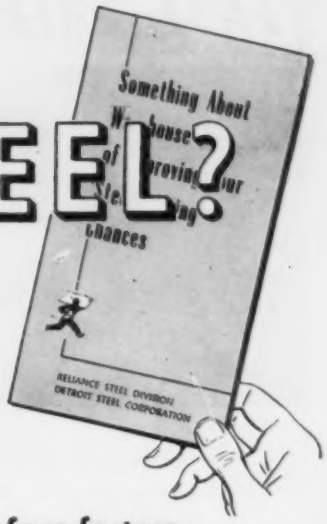

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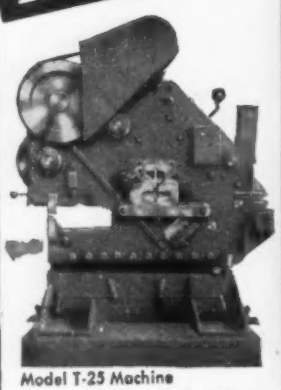
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Tees	3-1/8" x 5/16"	4" x 3/8"
Angles	3-1/8" x 5/16"	4" x 3/8"
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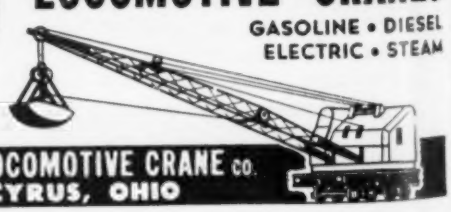

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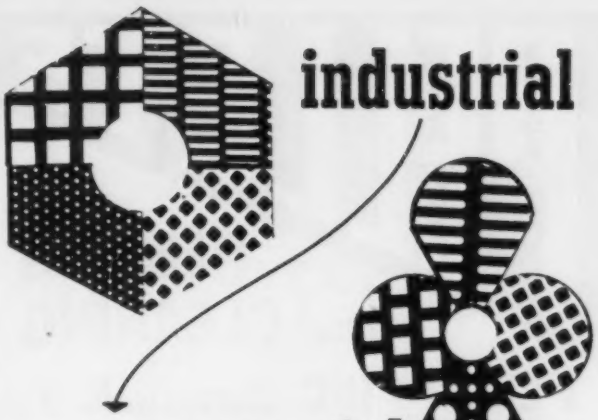

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See our Advt on Page 181 May 3

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IRON AGE *markets and prices*

market briefs and bulletins

RFC tin sales peak — With Reconstruction Finance Corp.'s tin price staying at $1.06 throughout all of last week, sales totaled the highest in months. Total sold by the agency was 2017 tons, about eight times as much as the previous week. Breakdown was: 1787 tons of Grade A; 205 tons of off-grade; and 25 tons of Copan. Nearly 1600 tons were sold on Tuesday and Wednesday, the week's peak.

NPA orders—Producers of steel drums 18-gage or lighter are directed to set aside 5 pct of June to September output for petroleum exporters—one-eighth of normal. Exporters of replacement parts and accessories may continue use of DO-97 in July and may use the same rating to obtain up to 60 pct of their May and June MRO export quotas—a 20 pct increase.

for export — The Office of International Trade has been specified as authority to make allotments of controlled materials for export and to authorize use of allotment numbers by exporters.

price increases—Producers of steels containing more than 5 pct nickel will raise prices shortly to reflect the recent 6¢ per lb increase in the price of nickel. The increases will range from ¼¢ per lb to 1¾¢ per lb, depending on the nickel content. The producers have notified OPS of plans to make the price boosts. High speed steel prices also will go up to reflect tungsten price rises.

may allocate domestic lead — NPA announced this week that it is considering possible allocation of domestic lead and that it may issue such an order next week. It is also expected that OPS may try to establish a price order covering lead scrap in the near future.

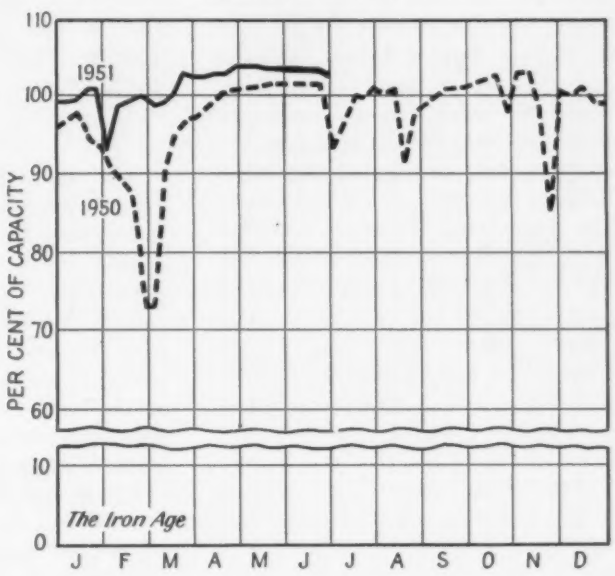
Canadian plant closes—Canadian credit restrictions have forced Ford of Canada to close its Windsor, Ont., plant. Company officials claim that the restrictions caused a sharp drop in auto and truck sales. The 11,000 man force will return July 3 for 1 week until layoff schedules can be drawn up.

prices too low — Automobile graveyard operators continue to insist that scrap metal prices are too low to increase activity. Thousands of tons of steel scrap which should be going to western furnaces still lie dormant in many argicultural areas in the Pacific Northwest.

special pricing order—OPS' order on machine tools was signed last Monday and should be out today, Thursday. The order, deleting some of the inequities which had put the lid on the machine tool output, was expected last week but got tied up in OPS. (See THE IRON AGE, p. 110, June 21, 1951).

coal washer—Sharon Steel Corp. is planning to build a $1.25 million coal washing plant at its Jo-Anne Coal Mines at Rachel, W. Va. A certificate of necessity for the project has been obtained.

Steel Operations †



District Operating Rates—Per Cent of Capacity †

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	West	Buffalo	Cleveland	Detroit	Wheeling	South	Ohio River	St. Louis	East	Aggregate
June 17	104.0	106.0	96.0	100.5	104.0	104.0	99.5	101.0*	102.0	99.0	91.5	92.0	112.5	103.5
June 24	103.0	106.0	96.0	100.5	106.0	104.0	98.0	106.0	101.0	99.0	87.0	89.0	96.5	103.0

* Revised.
† Beginning Jan. 1, 1951, operations are based on annual capacity of 104,729,650 net tons.

nonferrous metals

outlook and market activities

NONFERROUS METAL PRICES

	June 20	June 21	June 22	June 23	June 25	June 26
Copper, electro, Conn.	24.50	24.50	24.50	24.50	24.50	24.50
Copper, Lake delivered	24.625	24.625	24.625	24.625	24.625	24.625
Tin, Straits, New York	$1.06	$1.06	$1.06	....	$1.06	$1.06*
Zinc, East St. Louis	17.50	17.50	17.50	17.50	17.50	17.50
Lead, St. Louis	16.80	16.80	16.80	16.80	16.80	16.80

*Tentative.

Note: Quotations are going prices.

by R.Hatschek

At Long Last—All other news, in the metals field at least, must take a back seat to CPR 46 and 47, both issued late last week. These are the long awaited ceiling price regulations on copper and brass scrap which roll these prices back into a more normal relationship with the fixed prices of new metal. No. 1 copper has been pushed back to 19¼¢ per lb and other grades correspondingly.

Dealers' buying prices have not yet arrived at their actual level since the order went into effect on June 26 and our deadline was a bit too early to pick up the latest market information. In discussing the order with dealers, however, it is felt that dealers' prices will fall into line at about 1½ to 2¢ per lb under the ceilings. These prices, along with ceilings on brass mill, custom smelter and ingot maker scrap will be found on the opposite page.

The Right Step — All parties concerned are generally in favor of the new regulations but a few have complained about minor details such as the dates and differentials in the orders. Brass mill men welcomed the rollbacks with open arms—they have been calling for them for months. (See THE IRON AGE, June 21, page 109.) Dealers now feel that they know pretty much where they stand and are happy to be released from the General Price Regulation.

The rollbacks will no doubt have their effect on other prices as well. It is reported that a price schedule for brass mill products is being worked on in Washington. This one will also have to take into account the differential between U. S. and Chilean copper prices. Another expected effect is that secondary brass and bronze ingot prices will come down as soon as industry adjusts to the new price laws.

Aid to CMP — Another order concerning copper and aluminum is National Production Authority's M-47A (see p. 95). This order establishes a list A, less essential, and a list B, more essential, of consumer durable goods and assigns manufacturers of those goods percentages of base period consumption of copper and aluminum (also iron and steel).

Producers of list A items may use 60 pct as much copper and 50 pct as much aluminum, while list B producers may use 80 pct of the copper and 75 pct of the aluminum consumed during the base period. Base period for list A is the first half of 1950 and for list B it is the first quarter of 1951. The order takes effect July 1 and is designed to ease the shift from DO to CMP.

Further Nickel Cut—NPA also said that M-14 may soon be amended to prohibit the use of nickel in the manufacture of many items of commercial food cooking equipment. This is but one of a number of steps to be taken in an effort to trim third quarter nickel allotments down from the 2.5 million lb of requests to fit the available supplies.

New Aluminum—The fifth potline at the Reynolds Metals Co. plant in Jones Mills, Ark., is scheduled to go into production within a week if all goes as planned. The new line will add 50 million lb per year of new aluminum capacity to U. S. industry and it is the first new facility to be brought into production in the current expansion program. Reynolds' 150-million-lb plant near Corpus Cristi, Tex., is slated to come in early next year.

There has been much controversy lately on whether or not Harvey Machine Co. actually will enter the primary aluminum business. Harvey officials say they are going ahead with their plans regardless of the outcome of the loan application. They estimate needs at $80 million and plan to raise $10 million on their own with $70 million to be loaned by Reconstruction Finance Corp.

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt. frt. allowed)

Flat Steel: 0.188 in., 2S, 3S, 30.1¢; 4S, 61S-O, 32¢; 52S, 34.1¢; 24S-O, 24S-OAL, 32.9¢; 75S-O, 75S-OAL, 39.9¢; 0.081 in., 2S, 3S, 31.2¢; 4S, 61S-O, 33.5¢; 52S, 35.6¢; 24S-O, 24S-OAL, 34.1¢; 75S-O, 75S-OAL, 41.8¢; 0.032 in., 2S, 3S, 32.9¢; 4S, 61S-O, 37.1¢; 52S, 39.8¢; 24S-O, 24S-OAL, 41.7¢; 75S-O, 75S-OAL, 52.2¢.

Plate ¼ in. and heavier: 2S, 3S-F, 28.3¢; 4S-F, 30.2¢; 52S-F, 31.8¢; 61S-O, 30.3¢; 24S-O, 24S-OAL, 32.4¢; 75S-O, 75S-OAL, 38.8¢.

Extruded Solid Shapes: Shape factors 1 to 5, 36.2¢ to 74.5¢; 12 to 14, 36.9¢ to 39¢; 24 to 26, 39.6¢ to $1.16; 36 to 38, 47.2¢ to $1.70.

Rod, Rolled: 1.5 to 4.5 in., 2S-F, 3S-F, 37.5¢ to 38.5¢; cold finished, 0.375 to 3 in., 2S-F, 3S-F, 40.5¢ to 35¢.

Screw Machine Stock: Rounds, 11S-T3, ⅛ to 11/32 in., 53.5¢ to 42¢; ⅜ to 1½ in., 41.5¢ to 39¢; 1 9/16 to 3 in., 38.5¢ to 36¢; 17S-T4 lower by 1.5¢ per lb. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in., 2S, 39.5¢ to 29¢; 52S, 48¢ to 35¢; 56S, 51¢ to 42¢; 17S-T4, 54¢ to 37.5¢; 61S-T4, 48.5¢ to 37¢; 75S-T6, 84¢ to 67.5¢.

Extruded Tubing, Rounds: 63-S-T-5, OD in in.: 1¼ to 2, 37¢ to 54¢; 2 to 4, 33.5¢ to 45.5¢; 4 to 6, 34¢ to 41.5¢; 6 to 9, 34.5¢ to 43.5¢.

Roofing Sheet, Flat: 0.019 in. x 28 in. per sheet, 72 in., $1.142; 96 in., $1.522; 120 in., $1.902; 144 in., $2.284. Gage 0.024 in. x 28 in., 72 in., $1.379; 96 in., $1.839; 120 in., $2.299; 144 in., $2.759. Coiled Sheet: 0.019 in. x 28 in., 28.2¢ per lb.; 0.024 in. x 28 in. 26.9¢ lb.

Magnesium

(F.O.B. mill, freight allowed)

Sheet and Plate: FS1-O, ¼ in. 63¢; 3/16 in. 65¢; ⅛ in. 67¢; B & S Gage 10, 68¢; 12, 72¢; 14, 78¢; 16, 85¢; 18, 93¢; 20, $1.05; 22, $1.27; 24, $1.67. Specification grade higher. Base: 30,000 lbs.

Extruded Round Rod: M, diam in., ¼ to 0.311 in., 74¢; ½ to ¾ in., 57.5¢; 1¼ to 1.749 in., 53¢; 2½ to 5 in., 48.5¢. Other alloys higher. Base Up to ¾ in. diam, 10,000 lb; ¾ to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes, Rectangles: M. In weight per ft, for perimeters less than size indicated, 0.10 to 0.11 lb, 3.5 in., 62.3¢; 0.22 to 0.25 lb, 5.9 in., 59.3¢; 0.50 to 0.59 lb, 8.6 in., 56.7¢; 1.8 to 2.59 lb, 19.5 in., 53.8¢; 4 to 6 lb, 28 in., 49¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb. ½ to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: M, wall thickness, outside diam. in., 0.049 to 0.057, ¼ in. to 5/16, $1.40; 5/16 to ¾, $1.26; ½ to ⅝, 98¢; 1 to 2 in., 76¢; 0.165 to 0.219, ⅝ to ¾, 61¢; 1 to 2 in., 57¢; 3 to 4 in., 56¢. Other alloys higher. Base, OD in in.: Up to 1½ in., 10,000 lb; 1½ in. to 3 in., 20,000 lb; 3 in. and larger, 30,000 lb.

Titanium

(10,000 lb base, f.o.b. mill)

Commercially pure and alloy grades: Sheet and strip, HR or CR, $15; Plate, HR, $12; Wire, rolled and/or drawn, $10; Bar, HR or forged, $6; Forgings, $6.

Nickel and Monel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel
Sheets, cold rolled	77	60½
Strip, cold-rolled	83	63½
Rods and bars	73	58½
Angles, hot-rolled	73	58½
Plates	75	59½
Seamless tubes	106	93½
Shot and blocks	..	53½

Copper, Brass, Bronze

(Freight prepaid on 200 lb)

	Sheet	Rods	Extruded Shapes
Copper	40.18	....	39.78
Copper, h-r	....	36.03	....
Copper, drawn	....	37.28	....
Low brass	38.47	38.16	....
Yellow brass	37.28	36.97	....
Red brass	38.86	38.55	....
Naval brass	42.27	36.33	37.59
Leaded brass	....	....	35.86
Com'l bronze	40.18	39.87	....
Mang. bronze	45.77	39.80	41.36
Phos. bronze	59.42	59.67	....
Munts metal	40.28	35.84	37.09
Ni silver, 10 pct	48.26	50.59	....
Arch. bronze	....	....	....

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed	19.00
Aluminum pig	18.00
Antimony, American, Laredo, Tex.	42.00
Beryllium copper, 3.75-4.25% Be	$1.56
Beryllium aluminum 5% Be, Dollars per lb contained Be	$69.00
Bismuth, ton lots	$2.25
Cadmium, del'd	$2.55
Cobalt, 97-99% (per lb)	$2.10 to $2.17
Copper, electro, Conn. Valley	24.50
Copper, Lake, delivered	24.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$200
Lead, St. Louis	16.80
Lead, New York	17.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb	24.50
Magnesium, sticks, 100 to 500 lb	42.00 to 44.00
Mercury, dollars per 76-lb flask, f.o.b. New York	$210-$213
Nickel electro, f.o.b. N.Y. warehouse	59.58
Nickel oxide sinter, at Copper Cliff, Ont., contained nickel	52.75
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$90 to $93
Silver, New York, cents per oz.	87.75
Tin, New York	$1.06
Titanium, sponge	$5.00
Zinc, East St Louis	17.50
Zinc, New York	18.25
Zirconium copper, 50 pct	$6.20

REMELTED METALS

Brass Ingot

(Cents per lb, delivered carloads)

85-5-5-5 ingot	
No. 115	29.00
No. 120	28.50
No. 123	28.00
80-10-10 ingot	
No. 305	35.00
No. 315	32.00
88-10-2 ingot	
No. 210	47.50
No. 215	44.50
No. 245	37.00
Yel'ow ingot	
No. 405	25.50
Manganese bronze	
No. 421	32.75

Aluminum Ingot

(Cents per lb, 30,000 lb lots)

95-5 aluminum-silicon alloys	
0.30 copper, max.	34.50-36.25
0.60 copper, max.	34.25-36.00
Piston alloys (No. 122 type)	31.00-32.50
No. 12 alum. (No. 2 grade)	30.25-31.25
108 alloy	31.50-32.00
195 alloy	32.50-33.00
13 alloy	34.50-36.00
ASX-679	31.50-33.25

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95-97½%	32.50-33.50
Grade 2—92-95%	31.50-32.50
Grade 3—90-92%	30.50-31.50
Grade 4—85-90%	29.50-30.50

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, 500 lb lots)

Copper	
Cast, oval, 15 in. or longer	39½
Electrodeposited	33¾
Rolled, oval, straight, delivered	38⅞
Forged ball anodes	43
Brass, 80-20	
Cast, oval, 15 in. or longer	34¾
Zinc, oval	26½
Ball anodes	25½
Nickel 99 pct plus	
Cast	76.00
Rolled, depolarized	77.00
Cadmium	$2.80
Silver 999 fine, rolled, 100 oz lots, per troy oz, f.o.b. Bridgeport, Conn.	97½

Chemicals

(Cents per lb, f.o.b. shipping points)

Copper cyanide, 100 lb drum	60.8
Copper sulfate, 99.5 crystals, bbl.	12.85
Nickel salts, single or double, 4-100 lb bags, frt. allowed	20½
Nickel chloride, 375 lb drum	27½
Silver cyanide, 100 oz lots, per oz	67½
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc cyanide, 100 lb drum	47.7

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add ½¢ per lb for shipments of 20,000 to 40,000 lb; add 1¢ for more than 40,000 lb)

	Heavy	Turnings
Copper	21½	20¾
Yellow Brass	19⅛	17⅞
Red brass	20¼	19⅝
Comm. bronze	20½	19¾
Mang. bronze	18¾	18
Brass rod ends	18⅞	....

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	19.25
No. 2 copper wire	17.75
Light copper	16.50
Refinery brass	17.25*
Radiators	15.50

*Dry copper content.

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	19.25
No. 2 copper wire	17.75
Light copper	16.50
No. 1 composition	19.50
No. 1 comp. turnings	19.25
Rolled brass	15.50
Brass pipe	16.50
Radiators	15.50

Aluminum

Mixed old cast	21 —22
Mixed new clips	24 —25
Mixed turnings, dry	21 —21½
Pots and pans	21 —22
Low copper	25

Dealers' Scrap

(Dealers' buying prices, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire	17¼—17¾
No. 2 heavy copper and wire	15¾—16¼
Light copper	14½—15
New type shell cuttings	14½—15
Auto radiators (unsweated)	13½—14
No. 1 composition	17½—18
No. 1 composition turnings	17¼—17¾
Unlined red car boxes	17¼—17¾
Cocks and faucets	14¾—15¼
Mixed heavy yellow brass	12 —12½
Old rolled brass	13½—14
Brass pipe	14½—15
New soft brass clippings	14½—15
Brass rod ends	16⅞—17⅜
No. 1 brass rod turnings	17¼—17¾

Aluminum

Alum. pistons and struts	14 —14½
Aluminum crankcases	17 —17½
2S aluminum clippings	21½—22
Old sheet and utensils	17 —17½
Borings and turnings	13 —14
Misc. cast aluminum	17 —17½
Dural clips (24S)	17 —17½

Zinc

New zinc clippings	12¼—12½
Old zinc	9 — 9¼
Zinc routings	5¾— 6
Old die cast scrap	5¾— 6

Nickel and Monel

Pure nickel clippings	35 —36
Clean nickel turnings	35 —36
Nickel anodes	35 —36
Nickel rod ends	35 —36
New Monel clippings	28 —29
Clean Monel turnings	20 —21
Old sheet Monel	28 —29
Nickel silver clippings, mixed	13 —14
Nickel silver turnings, mixed	12 —13

Lead

Soft scrap, lead	16½—16¾
Battery plates (dry)	9½—10

Magnesium

Segregated solids	15 —16
Castings	14 —15

Miscellaneous

Block tin	85 —90
No. 1 pewter	60 —65
No. 1 auto babbitt	50 —55
Mixed common babbitt	16 —17
Solder joints	21 —22
Siphon tops	55 —60
Small foundry type	18¾—19
Monotype	17½—18
Lino. and stereotype	17
Electrotype	15¾—16
Hand picked type shells	11¼—11¾
Lino. and stereo. dross	9½—10
Electro. dross	7½— 8

SCRAP *iron and steel*

markets prices trends

Post higher estimates for scrap needs this year . . . Special measures needed, must succeed . . . New era opening.

A more realistic view on how much purchased scrap will be used this year has been offered. The widely-publicized figure of 32.5 million tons has been tossed out the window. The new estimate runs about 37 million tons and perhaps more.

Consumption is now running about 3 million tons a month. This adds up to about 36 million tons for the annual rate. But the estimate must go up because new steelmaking capacity is coming in. NPA is guessing closer to 38 million.

To raise this incredible amount of scrap and keep the metalmaking rate from faltering, special measures must be taken. (See p. 91 for full story.) The National Scrap Salvage Drive is a desperation measure and scrap men are too aware that it must succeed.

Although it may not be a long-term solution to increasing need for scrap, the drive may put us over the hump temporarily. New capacity will continue to come in, more heavily in 1952, and demand for scrap will reach greater heights. The scrap drive will have to be a permanent one. The safe stockpile of 60 days will have to be forgotten as a luxury now impossible. Collections must reach into the winter. Remote sources of scrap must be opened up and kept open for good.

Except for about 400,000 tons of war scrap sunk in the Pacific, the scrap to feed the new titan of steelmaking must be drawn from America.

Scrap men are entering a new era—that of hustling for every ton and finding new ways and new places to get scrap.

PITTSBURGH—Scrap consumption and supply appear to have leveled off, at least temporarily. Mills report they have been able to keep even with the boards in the last several weeks. A large consumer picked up enough tonnage to lift his inventory slightly. Generally, however, the situation is still described as precarious, with the ever-present danger of forced shutdowns to worry steel producers.

CHICAGO — Steel mill operations continued at high levels this week in face of continually dwindling inventories. Some sources here report some action may be taken in Washington this week to put ceilings on unprepared heavy melting steel. Dealers report offers of $41.00 and $40.00 per gross ton for unprepared heavy melting. Clippings are said to be bringing $42.50 per gross ton. A major consumer, one of whose plants has reached less than a week's inventory, is reported to be still directing allocations through brokers to the East. One small mill formerly in very bad shape is said to have built up its inventory to 2 weeks through allocations.

PHILADELPHIA—While mills in this district are still somewhat better off than some of the desperation cases in the West, the situation is poor and if things continue the way they are some openhearths will have to go out later. Dealer scrap has been allocated to some of the mills in this area. Yard intake and collections are very poor and the rush to sell copper and brass scrap before those price ceilings take effect has cut into activity on steel scrap.

NEW YORK — The market held the same tone as last week. Estimates of purchased scrap needs for 1951 went past the original 32.5 million tons. It will be 37 million or a possible 38 million tons. Where all this scrap will come from is a $64 question but the Scrap Institute feels that the goal will be reached. The field has taken on some mighty tough jobs before and has never been stumped.

DETROIT — While dealers and openhearth steel makers seem to have no serious objections to the proposed marriage of No. 1 and No. 2 scrap, some strong arguments have been voiced by electric furnace steelmakers. Critics see the proposed move as a shotgun wedding which will encourage sloppy scrap handling and contamination of melts. It is pointed out, however, that deterioration of steel quality could, if necessary, be corrected by allocations of higher percentages of No. 1 industrial scrap to electric furnaces.

CLEVELAND — Scrap, as one broker put it, is scarce, high and crazy here and in the Valley this week. Mills and other major consumers are eating up their stockpiles. Good, heavy material is hard to find. Big volume is in No. 2 bundles and similar material, and light steel, some of which is moving to the foundries. The plant vacation period is coming up shortly. It will help some of the foundries for the time being. Mill buyers report shipments in varying volume and it is becoming an accepted fact that you can't be tough on quality and still get tonnage.

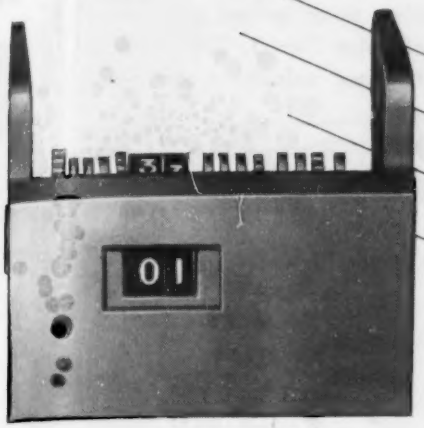
BIRMINGHAM—The cast scrap market continues to improve but better grades of steel are exceedingly scarce and scrap dealers look for little immediate improvement. Electric furnace grades also are in better supply. But more of all grades is needed to assure an adequate supply for the remainder of the summer.

CINCINNATI — Mill inventories are dwindling in this district and more allocations are being made. Inventory-wise, foundries are in a better position at the moment than openhearth and electric furnaces, a complete reversal of the situation which prevailed 2 months ago. Blast furnace grades are in relatively easy supply, but shipments of openhearth and electric furnace material dropped an estimated 25 pct in the past week. Very little scrap is being held in anticipation of combined grades.

ST. LOUIS—A further slowing down of the movement of scrap iron to the St. Louis industrial district is reported. This is due to a combination of factors: factory production is being curtailed because of summer vacations, farmers are busy in their fields, and rains have hampered operations in yards. Railroad material is being allocated, with the exception of a car or so of miscellaneous grades. Nearly all shippers are receiving allocations.

BOSTON—There is continued good activity in all grades of iron and steel scrap throughout the New England area. The market generally has indicated a brisk demand with little or no change over the past few weeks.

BUFFALO—Three leading mills report increases in scrap receipts but the situation is still serious. A check of foundries shows that the ratio of scrap to pig iron in melting has risen.



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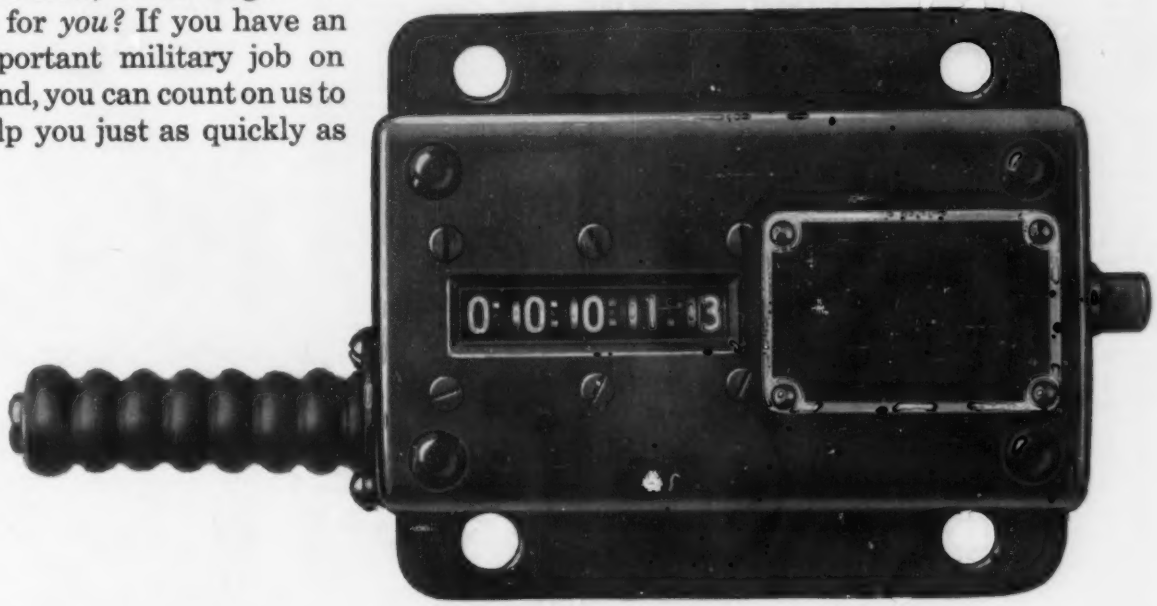


VEEDER-ROOT COUNTERS *"Count Everything on Earth"*

Iron and Steel

SCRAP PRICES

(Maximum basing point prices, per gross ton, as set by OPS, effective Feb. 7, 1951. Shipping point and delivered prices calculated as shown below.)

Switching Charge (Dollars per gross ton) →		$0.99 .75 .63 .65 .75 .51 .75		.75 .51 .51 .75 .70	.76 .83 .65 .26	1.34 .79 .50 .20 .51 .51	.20 .52 .47 .51 .51	.51	.95	.50	.78	.50 .43 .51	.33	.57	.66 .65 .52 .69 .69
Basing Points →		Pittsburgh Johnstown Brackenridge Butler Midland Monessen Sharon		Youngstown Canton Steubenville Warren Welrton	Cleveland Buffalo Cincinnati Middletown	Chicago Claymont Coatesville Conshohocken Harrisburg Phoenixville	Sparrows Pt. Bethlehem Ashland, Ky. Kokomo, Ind. Portsmouth, O.	St. Louis	Detroit	Duluth	Kansas City	Birmingham Alabama City Atlanta	Minneapolis	Houston	Los Angeles Pittsburg, Cal. Portland, Ore. San Francisco Seattle
GRADES	OPS No.														
No. 1 heavy melting	1	$44.00		$44.00	$43.00	$42.50	$42.00	$41.00	$41.15	$40.00	$39.50	$39.00	$38.00	$37.00	$35.00
No. 2 heavy melting	2	42.00		42.00	41.00	40.50	40.00	39.00	39.15	38.00	37.50	37.00	36.00	35.00	33.00
No. 1 busheling	3	44.00		44.00	43.00	42.50	42.00	41.00	41.15	40.00	39.50	39.00	38.00	37.00	35.00
No. 1 bundles	4	44.00		44.00	43.00	42.50	42.00	41.00	41.15	40.00	39.50	39.00	38.00	37.00	35.00
No. 2 bundles	5	41.00		41.00	40.00	39.50	39.00	38.00	38.15	37.00	36.50	36.00	35.00	34.00	32.00
Machine shop turnings	6	34.00		34.00	33.00	32.50	32.00	31.00	31.15	30.00	29.50	29.00	28.00	27.00	25.00
Mixed borings and turnings	7	38.00		38.00	37.00	36.50	36.00	35.00	35.15	34.00	33.50	33.00	32.00	31.00	29.00
Shovelling turnings	8	38.00		38.00	37.00	36.50	36.00	35.00	35.15	34.00	33.50	33.00	32.00	31.00	29.00
Cast iron borings	10	38.00		38.00	37.00	36.50	36.00	35.00	35.15	34.00	33.50	33.00	32.00	31.00	29.00
No. 1 chemical borings	26	41.00		41.00	40.00	39.50	39.00	39.00	38.15	37.00	36.50	36.00	35.00	34.00	32.00
Forge crops	11	51.50		51.50	50.50	50.00	49.50	48.50	48.65	47.50	47.00	46.50	45.50	44.50	42.50
Bar crops and plate	12	49.00		49.00	48.00	47.50	47.00	46.00	46.15	45.00	44.50	44.00	43.00	42.00	40.00
Punchings and plate	14	46.50		46.50	45.50	45.00	44.50	43.50	43.65	42.50	42.00	41.50	40.50	39.50	37.50
Electric furnace bundles	15	46.00		46.00	45.00	44.50	44.00	43.00	43.15	42.00	41.50	41.00	40.00	39.00	37.00
Cut struct., plate, 3 ft and less	16	47.00		47.00	46.00	45.50	45.00	44.00	44.15	43.00	42.50	42.00	41.00	40.00	38.00
Cut struct., plate, 2 ft and less	17	49.00		49.00	48.00	47.50	47.00	46.00	46.15	45.00	44.50	44.00	43.00	42.00	40.00
Cut struct., plate, 1 ft and less	18	50.00		50.00	49.00	48.50	48.00	47.00	47.15	46.00	45.50	45.00	44.00	43.00	41.00
Foundry steel, 2 ft and less	20	46.00		46.00	45.00	44.50	44.00	43.00	43.15	42.00	41.50	41.00	40.00	39.00	37.00
Foundry steel, 1 ft and less	21	48.00		48.00	47.00	46.50	46.00	45.00	45.15	44.00	43.50	43.00	42.00	41.00	39.00
Heavy trimmings	24	43.00		43.00	42.00	41.50	41.00	40.00	40.15	39.00	38.50	38.00	37.00	36.00	34.00
No. 1 RR heavy melting	RR 1	46.00		46.00	45.00	44.50	44.00	43.00	43.15	42.00	41.50	41.00	40.00	39.00	37.00
Scrap rails, random lengths	RR 14	48.00		48.00	47.00	46.50	46.00	45.00	45.15	44.00	43.50	43.00	42.00	41.00	39.00
Scrap rails, 3 ft and less	RR 16	51.00		51.00	50.00	49.50	49.00	48.00	48.15	47.00	46.50	46.00	45.00	44.00	42.00
Scrap rails, 2 ft and less	RR 17	52.00		52.00	51.00	50.50	50.00	49.00	49.15	48.00	47.50	47.00	46.00	45.00	43.00
Scrap rails, 18 in. and less	RR 18	54.00		54.00	53.00	52.50	52.00	51.00	51.15	50.00	49.50	49.00	48.00	47.00	45.00
Rerolling rails	RR 15	53.00		53.00	52.00	51.50	51.00	50.00	50.15	49.00	48.50	48.00	47.00	46.00	44.00
Uncut tires	RR 20	48.00		48.00	47.00	46.50	46.00	45.00	45.15	44.00	43.50	43.00	42.00	41.00	39.00
Cut tires	RR 21	51.00		51.00	50.00	49.50	49.00	48.00	48.15	47.00	46.50	46.00	45.00	44.00	42.00
Cut bolsters and side frames	RR 23	49.00		49.00	48.00	47.50	47.00	46.00	46.15	45.00	44.50	44.00	43.00	42.00	40.00
RR specialties	RR 24, 28, 29	51.00		51.00	50.00	49.50	49.00	48.00	48.15	47.00	46.50	46.00	45.00	44.00	42.00
Solid steel axles	RR 25	58.00		58.00	57.00	56.50	56.00	55.00	55.15	54.00	53.50	53.00	52.00	51.00	49.00
No. 3 steel wheels	RR 27	51.00		51.00	50.00	49.50	49.00	48.00	48.15	47.00	46.50	46.00	45.00	44.00	42.00

Cast Scrap

(F.o.b. all shipping points)

Grades	OPS No.	
Cupola cast	1	$49.00
Charging box cast	3	47.00
Heavy breakable cast	3	45.00
Cast iron brake shoes	5	41.00
Stove plate	6	46.00
Clean auto cast	7	52.00
Unstripped motor blocks	8	43.00
Cast iron carwheels	9	47.00
Malleable	10	55.00
Drop broken mach'y. cast	11	52.00

Ceiling price of clean cast iron foundry runouts or prepared cupola drops is 75 pct of corresponding grade.

SWITCHING DISTRICTS—These basing points include the indicated switching districts: Pittsburgh; Bessemer, Homestead, Duquesne, Munhall. Cincinnati; Newport. St. Louis; Granite City, East St. Louis, Madison, and Federal, Ill. San Francisco; South San Francisco, Niles, Oakland. Claymont; Chester. Chicago; Gary.

SHIPPING POINT PRICES (Except RR scrap)—For shipping points within basing points, the ceiling shipping point price is the basing point price, less switching charge. The ceiling for shipping points outside basing points is the basing point price yielding the highest shipping point price, less the lowest established freight charge. Dock charge, where applicable, is $1.25 per gross ton except: Memphis, 95¢; Great Lakes ports, $1.50, and New England ports, $1.75. Maximum shipping point price on No. 1 heavy melting steel in New York City is $36.99 per gross ton with set differentials for other grades. Hudson and Bergen County, N. J., shipping point prices are computed from Bethlehem basing point. All New Jersey computations use all-rail transport. Ceiling need not fall below $32 per gross ton for No. 1 heavy melting steel, with set differentials for other grades. Cast scrap shipping point prices are given in table.

DELIVERED PRICES (RR scrap) — Ceiling on-line price of a RR operating in a basing point is the top in the highest priced basing point in which the RR operates. For off-line prices, RR's not operating in basing point, non-operating RR's, and RR scrap sold by someone other than a RR see text of order, THE IRON AGE, Feb. 8, 1951, p. 137-C.

DELIVERED PRICES (Except RR scrap)—Ceiling is the shipping point price plus actual freight charge, tax included. Dock charges, where applicable, are as above.

UNPREPARED SCRAP—Ceiling price is $8 a ton less than prepared base grades (No. 1 heavy & No. 1 RR heavy). Scrap suitable for compressing into No. 1 bundles is $6 less than No. 1 bundles; suitable for compressing into No. 2 bundles, $8 less than No. 2 bundles. For cast material requiring special preparation, price is breakable cast less preparation costs.

COMMISSIONS—Brokers are permitted a maximum of $1 per gross ton commission which must be separate on the bill.

ALLOY PREMIUMS—These alloy extras are permitted: Nickel; $1.25 may be added to price of No. 1 heavy for each 0.25 pct nickel between 1 and 5.25 pct. **Molybdenum**; $2 may be added to price of No. 1 heavy for molybdenum over 0.15 pct, $3 for content over 0.65 pct. **Manganese**; $4 may be added to price of No. 1 heavy or No. 1 RR heavy for content over 10 pct if scrap is in sizes over 8 x 12 x 24 in., $14 if less than 8 x 12 x 24 in. Manganese premium applicable only if sold for electric furnace use or on NPA allocation. **Silicon**: electric furnace and foundry grade adjustments are not applicable if silicon content is between 0.5 and 1.75 pct. **Chromium**; $1 may be added if scrap conforms to SAE 52100 analysis. **Multiple Alloys**; if scrap contains two premium alloy elements, total premium may not exceed ceiling premium for any one contained alloy.

RESTRICTONS ON USE—Ceiling prices on some scrap items may fluctuate with use by consumers. If some scrap is purchased for its established specialized use, the ceiling price set in the order stands. But if some special grades are purchased for other uses, the ceiling price charge shall be the price of the scrap grade being substituted. For example, the price established for Grade 28 (wrought iron) may be charged only when sold to a producer of wrought iron. Otherwise the ceiling price shall not exceed the ceiling price for the corresponding grade of basic openhearth. Restrictions on use are placed on the following grades: Chemical borings, wrought iron and rerolling rails, cupola cast, billet, bloom, and forge crops, Nos. 1 and 2 chemical borings. Ceiling prices on billet bloom and forge crops, alloy-free turnings, and heavy turnings may be charged only when shipped directly from industrial producer. NPA prohibits openhearth users from buying electric furnace grades, Nos. 11 through 18, foundry grades, Nos. 20 and 21 and cast grades, 1, 7, 9 and 11.

CEILING INTRANSIT PREPARATION CHARGES (Dollars per gross ton)

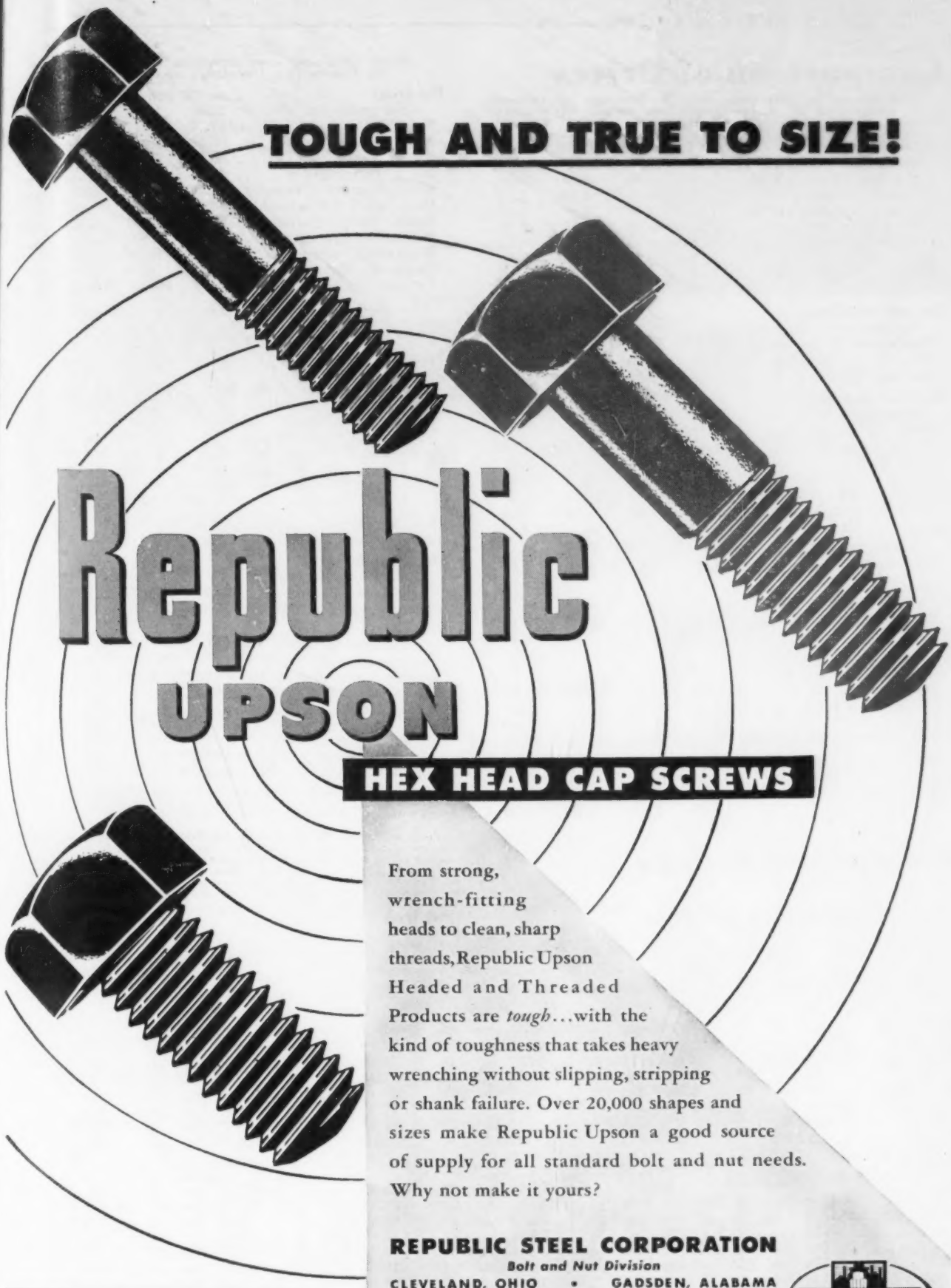
No. 1 heavy; No. 2 heavy; No. 1 RR heavy; No. 2 RR heavy; No. 1 busheling; No. 2 bundles; electric furnace bundles	$ 8.00
No. 1 bundles; briquetted turnings or cast iron borings; No. 1 RR sheet scrap	6.00
Crushing machine shop turnings	8.00
Bar crops and plate, cast steel, punchings and plate, cut structural and plate, 3 ft and under, foundry steel, 2 ft and under, wrought iron	10.00
Structural, plate scrap, 2 ft and less, foundry steel 1 ft and less	11.00
Structural and plate scrap, 1 ft and less	12.00
Rails, 3 ft & less; cut tires; cut bolsters & side frames	4.00
Rails, 2 ft & less	5.00
Rails, 18 in. & less	7.00

Hamilton, Ontario

(Consumers buying prices, del'd gross ton)

Hvy. melting steel	$35.00
No. 1 bundles	35.00
No. 2 bundles	34.50
Mechanical bundles	33.00
Mixed, steel scrap	31.00
Rails, remelting	35.00
Rails, rerolling	38.00
Bushelings	29.50
Bushelings, prepared new factory	33.00
Bushelings, unprepared new factory	28.00
Short steel turnings	28.00
Mixed borings, turnings	28.00
Cast scrap	58.00 to 60.00

TOUGH AND TRUE TO SIZE!



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ARE YOU SLOWING STEEL PRODUCTION?
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Comparison of Prices

Steel prices in this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Flat-Rolled Steel: (cents per pound)	June 26, 1951	June 19, 1951	May 29, 1951	June 27, 1950
Hot-rolled sheets	3.60	3.60	3.60	3.35
Cold-rolled sheets	4.35	4.35	4.35	4.10
Galvanized sheets (10 ga)	4.80	4.80	4.80	4.40
Hot-rolled strip	3.50	3.50	3.50	3.25
Cold-rolled strip	4.75	4.75	4.75	4.21
Plate	3.70	3.70	3.70	3.50
Plates wrought iron	7.85	7.85	7.85	7.85
Stains C-R-strip (No. 302)	36.50	36.50	36.50	33.00
Tin and Ternplate: (dollars per base box)				
Tinplate (1.50 lb.) cokes.	$8.70	$8.70	$8.70	$7.50
Tinplate, electro (0.50 lb.)	7.40	7.40	7.40	6.60
Special coated mfg. ternes	7.50	7.50	7.50	6.35
Bars and Shapes: (cents per pound)				
Merchant bars	3.70	3.70	3.70	3.45
Cold finished bars	4.55	4.55	4.55	4.145
Alloy bars	4.30	4.30	4.30	3.95
Structural shapes	3.65	3.65	3.65	3.40
Stainless bars (No. 302)	31.25	31.25	31.25	28.50
Wrought iron bars	9.50	9.50	9.50	9.50
Wire: (cents per pound)				
Bright wire	4.85	4.85	4.85	4.50
Rails: (dollars per 100 lb)				
Heavy rails	$3.60	$3.60	$3.60	$3.40
Light rails	4.00	4.00	4.00	3.75
Semifinished Steel: (dollars per net ton)				
Rerolling billets	$56.00	$56.00	$56.00	$54.00
Slabs, rerolling	56.00	56.00	56.00	54.00
Forging billets	66.00	66.00	66.00	63.00
Alloy blooms billets, slabs	70.00	70.00	70.00	66.00
Wire Rod and Skelp: (cents per pound)				
Wire rods	4.10	4.10	4.10	3.85
Skelp	3.35	3.35	3.35	3.15

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*

Pig Iron: (per gross ton)	June 26, 1951	June 19, 1951	May 29, 1951	June 27, 1950
No. 2 foundry, del'd Phila.	$57.77	$57.77	$57.77	$50.42
No. 2, Valley furnace	52.50	52.50	52.50	46.50
No. 2, Southern Cin'ti	55.58	55.58	55.58	49.08
No. 2, Birmingham	48.88	48.88	48.88	42.38
No. 2, foundry, Chicago†	52.50	52.50	52.50	46.50
Basic del'd Philadelphia	56.92	56.92	56.92	49.92
Basic, Valley furnace	52.00	52.00	52.00	46.00
Malleable, Chicago†	52.50	52.50	52.50	46.50
Malleable, Valley	52.50	52.50	52.50	46.50
Charcoal, Chicago	70.56	70.56	70.56	68.56
Ferromanganese‡	186.25	186.25	186.25	173.40

†The switching charge for delivery to foundries in the Chicago district is $1 per ton.
‡Average of U. S. prices quoted on Ferroalloy page.

Scrap: (per gross ton)	June 26, 1951	June 19, 1951	May 29, 1951	June 27, 1950
No. 1 steel, Pittsburgh	$44.00*	$44.00*	$44.00*	$41.75
No. 1 steel, Phila. area	42.50*	42.50*	42.50*	33.75
No. 1 steel, Chicago	42.50*	42.50*	42.50*	37.50
No. 1 bundles, Detroit	41.15*	41.15*	41.15*	37.50
Low phos. Young'n	46.50*	46.50*	46.50*	44.25
No. 1 cast, Pittsburgh	49.00†	49.00†	49.00†	43.75
No. 1 cast, Philadelphia	49.00†	49.00†	49.00†	39.50
No. 1 cast, Chicago	49.00†	49.00†	49.00†	45.50

*Basing Pt. †Shipping Pt.
Not including broker's fee after Feb. 7, 1951.

Coke: Connellsville: (per net ton at oven)	June 26, 1951	June 19, 1951	May 29, 1951	June 27, 1950
Furnace coke, prompt	$14.75	$14.75	$14.75	$14.25
Foundry coke, prompt	17.75	17.75	17.75	16.25

Nonferrous Metals: (cents per pound to large buyers)	June 26, 1951	June 19, 1951	May 29, 1951	June 27, 1950
Copper, electro, Conn.	24.50	24.50	24.50	22.50
Copper, Lake, Conn.	24.625	24.625	24.625	22.625
Tin, Straits, New York	$1.06†	$1.06	$1.39	78.25
Zinc, East St. Louis	17.50	17.50	17.50	15.00
Lead, St. Louis	16.80	16.80	16.80	11.30
Aluminum, virgin	19.00	19.00	19.00	17.50
Nickel, electrolytic	59.58	59.58	53.55	51.22
Magnesium, ingot	24.50	24.50	24.50	21.50
Antimony, Laredo, Tex.	42.00	42.00	42.00	24.50

†Tentative. *Revised.

Composite Prices

Starting with the issue of May 12, 1949, the weighted finished steel composite was revised for the years 1941 to date. The weights used are based on the average product shipments for the 7 years 1937 to 1940 inclusive and 1946 to 1948 inclusive. The use of quarterly figures has been eliminated because it was too sensitive. (See p. 130 of May 12, 1949, issue.)

	Finished Steel Base Price	Pig Iron	Scrap Steel
June 26, 1951	4.131¢ per lb.	$52.69 per gross ton	$43.00 per gross ton
One week ago	4.131¢ per lb.	52.69 per gross ton	43.00 per gross ton
One month ago	4.131¢ per lb.	52.69 per gross ton	43.00 per gross ton
One year ago	3.837¢ per lb.	46.38 per gross ton	37.67 per gross ton

	Finished Steel Base Price High	Finished Steel Base Price Low	Pig Iron High	Pig Iron Low	Scrap Steel High	Scrap Steel Low
1951	4.131¢ Jan. 2	4.131¢ Jan. 2	$52.69 Jan. 2	$52.69 Jan. 2	$47.75 Jan. 30	$43.00 Feb. 7
1950	4.131¢ Dec. 1	3.837¢ Jan. 3	52.69 Dec. 12	45.88 Jan. 3	45.13 Dec. 19	26.25 Jan. 3
1949	3.837¢ Dec. 27	3.3705¢ May 3	46.87 Jan. 18	45.88 Sept. 6	43.00 Jan. 4	19.33 June 28
1948	3.721¢ July 27	3.193¢ Jan. 1	46.91 Oct. 12	39.58 Jan. 6	45.16 July 27	39.75 Mar. 9
1947	3.193¢ July 29	2.848¢ Jan. 1	37.98 Dec. 30	30.14 Jan. 7	42.58 Oct. 28	29.50 May 20
1946	2.848¢ Dec. 31	2.464¢ Jan. 1	30.14 Dec. 10	25.37 Jan. 1	31.17 Dec. 24	19.17 Jan. 1
1945	2.464¢ May 29	2.396¢ Jan. 1	25.37 Oct. 23	23.61 Jan. 2	19.17 Jan. 2	18.92 May 22
1944	2.396¢	2.396¢	$23.61	$23.61	19.17 Jan. 11	15.76 Oct. 24
1943	2.396¢	2.396¢	23.61	23.61	$19.17	$19.17
1942	2.396¢	2.396¢	23.61	23.61	19.17	19.17
1941	2.396¢	2.396¢	$23.61 Mar. 20	$23.45 Jan. 2	$22.00 Jan. 7	$19.17 Apr. 10
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16	23.45 Dec. 23	22.61 Jan. 2	21.83 Dec. 30	16.04 Apr. 9
1939	2.35367¢ Jan. 3	2.26689¢ May 16	22.61 Sept. 19	20.61 Sept. 12	22.50 Oct. 3	14.08 May 16
1938	2.58414¢ Jan. 4	2.27207¢ Oct. 18	23.25 June 21	19.61 July 6	15.00 Nov. 22	11.00 June 7
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4	32.25 Mar. 9	20.25 Feb. 16	21.92 Mar. 30	12.67 June 9
1936	2.32263¢ Dec. 28	2.05200¢ Mar. 10	19.74 Nov. 24	18.73 Aug. 11	17.75 Dec. 21	12.67 June 8
1932	1.89196¢ July 5	1.83910¢ Mar. 1	14.81 Jan. 5	13.56 Dec. 6	8.50 Jan. 12	6.43 July 5
1929	2.31773¢ May 28	2.26498¢ Oct. 29	18.71 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec. 8

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strips, representing major portion of finished steel shipment. Index recapitulated in Aug. 28, 1941, issue and in May 12, 1949.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

One ounce of protection

AO's NEW INEXPENSIVE ALL PLASTIC GOGGLE

AO One Piece ALL PLASTIC GOGGLE

- LIGHTWEIGHT
- NON-FOGGING
- WELL-VENTILATED
- NON-FLAMMABLE
- WELL-FITTING

Note the many perforations which assure ample ventilation and minimize fogging.

Face contacting edges are rolled for greater comfort on this goggle which offers a wide range of vision.

Goggle fits comfortably over most personal glasses with nosepiece hugging nose snugly.

Made of impact resisting plastic, this one-piece goggle (AO479 Clear, AO480 Green) is "optically correct" and meets government specifications. It affords exceptional wide angle vision and can be worn over most standard types of personal glasses and most prescription spectacles and goggles. Recommended for protection against foreign particles striking from any direction on the following types of work: babbiting, chipping, cutting rivets, grinding, hand-tool operations, machine operations, spike driving and similar operations. Your nearest AO Safety Products Representative can supply you.

QUICK FACTS
479-480 GOGGLE

One size only but designed to fit all faces comfortably

Elastic headband, easily adjusted

4 point contact to face of wearer, resists rocking

Plastic nosepiece fits all noses comfortably and snugly

Rolled edges for comfort, better fit in contacting face

Order by number 479 Clear
Order by number 480 Green

American Optical COMPANY
SAFETY PRODUCTS DIVISION

SOUTHBRIDGE, MASSACHUSETTS • BRANCHES IN PRINCIPAL CITIES

IRON AGE

STEEL PRICES

Smaller numbers in price boxes indicate producing companies. For main office locations, see key on facing page.
Base prices at producing points apply only to sizes and grades produced in these areas. Prices are in cents per lb unless otherwise noted. Extras apply.

	Pittsburgh	Chicago	Gary	Cleveland	Canton Massillon	Middletown	Youngstown	Bethlehem	Buffalo	Conshohocken	Johnstown	Sparrows Point	Granite City	Detroit
INGOTS Carbon forging, net ton	$52.00[1]													
Alloy, net ton	$54.00[1,17]													$54.00[31]
BILLETS, BLOOMS, SLABS Carbon, rerolling, net ton	$56.00[1,5]	$56.00[1]	$56.00[1]						$56.00[3]		$56.00[3]			
Carbon forging billets, net ton	$66.00[1,5]	$66.00[1,4]	$66.00[1]	$66.00[4]	$66.00[4]				$66.00[3,4]	$73.00[26]	$66.00[3]			$69.00[31]
Alloy, net ton	$70.00[1,17,5]	$70.00[1,4]	$70.00[1,5]		$70.00[4]			$70.00[3]	$70.00[3,4]	$77.00[26]	$70.00[3]			$73.00[31]
PIPE SKELP	3.35[1] 3.45[5]						3.35[1,4]							
WIRE RODS	4.10[3] 4.30[18]	4.10[2,4,33]	4.10[6]	4.10[3]			4.10[6]		4.10[6,5]		4.10[3]	4.20[3]		
SHEETS Hot-rolled (18 ga. & hvr.)	3.60[1,5,9,15] 3.75[28]	3.60[8,33]	3.60[1,6,8]	3.60[4,5]		3.60[7]	3.60[1,4,6] 4.00[12]		3.60[3]	4.00[26]		3.60[3]	4.30[22]	3.80[12] 4.40[47]
Cold-rolled	4.35[1,5,9,15,7]		4.35[1,6,8]	4.35[4,5]		4.35[7]	4.35[4,6]		4.35[3]			4.35[3]	5.05[22]	4.55[12]
Galvanized (10 gage)	4.80[1,9,15]		4.80[1,8]		4.80[4]	4.80[7]	5.50[44] 6.00[64]					4.80[3]	5.50[22]	
Enameling (12 gage)	4.65[1]		4.65[1,8]	4.65[4]		4.65[7]	4.65[6]						5.35[22]	
Long terne (10 gage)	5.20[9,15]		5.20[1]			5.20[7]	6.00[64]							
Hi str. low alloy, h.r.	5.40[1,5] 5.75[9]	5.40[1]	5.40[1,8] 5.90[6]	5.40[4,5]			5.40[1,4,13] 5.90[6]		5.40[3]	5.65[26]		5.40[3]		5.95[12]
Hi str. low alloy, c.r.	6.55[1,5] 6.90[9]		6.55[1,8] 7.05[6]	6.55[4,5]			6.55[4] 7.05[6]		6.55[3]			6.55[3]		7.10[12]
Hi str. low alloy, galv.	7.20[1]											6.75[3]		
STRIP Hot-rolled	3.60[9], 4.00[41,58], 3.75[28] 3.80[5,7]	3.50[66]	3.50[1,6,8]			3.50[7]	3.50[1,4,6] 4.00[13]		3.50[3,4]	3.90[26]	3.50[3]	3.50[3]		4.40[47] 3.80[12]
Cold-rolled	4.65[5,7,9] 5.00[28] 5.35[40,63,68]	4.90[8,66]	4.90[6]	4.65[2,5]		4.65[7]	4.65[4,6] 5.25[49,40] 5.35[13,40]		4.65[3]			4.65[3]		4.85[12] 5.45[47] 5.80[58,61]
Hi str. low alloy, h.r.	5.75[9]		5.50[1] 5.30[8], 5.80[6]				4.95[4], 5.50[1] 5.40[13], 5.80[6]		4.95[3]	5.55[26]		4.95[3]		5.95[12]
Hi str. low alloy, c.r.	7.20[9]			6.55[2] 6.70[5]			6.20[4], 6.55[13] 7.05[6]		6.40[3]			6.40[3]		
TINPLATE† Cokes, 1.25-lb base box (1.50 lb, add 25¢)	$8.45[1,5,9,15]		$8.45[1,6,8]				$8.45[4]					$8.55[3]		
Electrolytic 0.25, 0.50, 0.75 lb box	0.25 lb base box, $7.15[1,4,5,8,9]; $7.25[3,11]; $7.35[32] 0.50 lb, add 25¢; 0.75 lb add 65¢													
BLACKPLATE, 29 gage Hollowware enameling	5.85[1] 6.15[15]		5.85[1]				5.30[4]							
BARS Carbon steel	3.70[1,5] 3.85[9]	3.70[1,4,33]	3.70[1,4,6,8]	3.70[4]	3.70[4]		3.70[1,4,6]		3.70[3,4]		3.70[3]			3.85[31]
Reinforcing	3.70[1,5]	3.70[4]	3.70[1,6,8]	3.70[4]			3.70[1,4,6]		3.70[3,4]		3.70[3]	3.70[3]		
Cold-finished	4.55[2,4,5,52,69,71]	4.55[2,23,70]	4.55[4,74,73]	4.55[3]	4.55[4,53]		4.55[6,57]		4.60[76]					4.70[64]
Alloy, hot-rolled	4.30[1,17]	4.30[1,4,33]	4.30[1,6,8]		4.30[4]		4.30[1,6]	4.30[6]	4.30[3,4]		4.30[3]			4.45[31] 4.65[12]
Alloy, cold-drawn	5.40[17,52,69,71,2]	5.40[4,23,69,70,73] 5.45[3]	5.40[4,73,74]		5.40[4,33]		5.40[6,25,57]	5.40[3]	5.40[3]					5.55[64]
Hi str. low alloy, h.r.	5.55[1,5]		5.55[1,8] 6.05[6]	5.55[4,5]			5.55[1] 6.05[6]	5.55[3]	5.55[3]		5.55[3]			
PLATE Carbon steel	3.70[1,5,15] 4.00[9]	3.70[1,33]	3.70[1,6,8]	3.70[4,5]			3.70[1,4,6] 3.95[12]		3.70[3]	4.15[26]	3.70[3]	3.70[3]	4.40[22]	
Floor plates	4.75[1]	4.75[1]	4.75[6]	4.75[5]						4.75[26]				
Alloy	4.75[1]	4.75[1]	4.75[1]				5.20[13]			5.05[26]	4.75[3]	4.75[3]		
Hi str. low alloy	5.65[1,5]	5.65[1]	5.65[1,8] 6.15[6]	5.65[4,5]			5.65[4] 5.70[13] 6.15[6]			5.90[26]	5.65[3]	5.65[3]		
SHAPES, Structural	3.65[1,5] 3.90[9]	3.65[1,33]	3.65[1,8]					3.70[3]	3.70[3]		3.70[3]			
Hi str. low alloy	5.50[1,5]	5.50[1]	5.50[1,8] 6.00[6]				6.00[6]	5.50[3]	5.50[3]		5.50[3]			
MANUFACTURERS' WIRE Bright	4.85[2,5] 5.10[15]	4.85[2] 4.33,34		4.85[2]			4.85[6]	Kokomo—4.95[30] 4.85[35]			4.85[3]	4.95[3]	Duluth—4.85[3]	
PILING, Steel Sheet	4.45[1]	4.45[1]	4.45[6]						4.45[3]					

STEEL PRICES

Smaller numbers indicate producing companies. See key at right. Prices are in cents per lb unless otherwise noted. Extras apply.

Kansas City	Houston	Birmingham	WEST COAST Seattle, San Francisco, Los Angeles, Fontana		
			F=$79.00[19]		INGOTS Carbon forging, net ton
	$62.00[83]		F=$80.00[19]		Alloy, net ton
		$56.00[11]	F=$75.00[19]		BILLETS, BLOOMS, SLABS Carbon, rerolling, net ton
	$74.00[83]	$66.00[11]	F=$85.00[19] SF, LS, S=$85.00[62]	Geneva=$66.00[16]	Carbon forging billets, net ton
	$78.00[83]		F=$89.00[19] LA=$90.00[62]		Alloy net ton
					PIPE SKELP
	4.50[83]	4.10[4,11]	SF=4.90[3], F=4.90[19] LA=4.90[24,62]	Worcester=4.40[2] Minnequa=4.35[14] Portsmouth=4.30[20]	WIRE RODS
		3.60[4,11]	SF, LA=4.30[24] F=4.55[19]	Niles=5.25[84], Geneva=3.70[16] Ashland=3.60[7]	SHEETS Hot-rolled (18 ga. & hvr.)
		4.35[11]	SF=5.30[24] F=5.30[19]		Cold-rolled
		4.80[4,11]	SF, LA=5.55[24]	Ashland=4.80[7] Kokomo=5.20[30]	Galvanized (10 gage)
				Ashland=4.65[7]	Enameling (12 gage)
					Long ternes (10 gage)
		5.40[11]	F=6.35[19]		Hi str. low alloy, h.r.
			F=7.50[19]		Hi str. low alloy, c.r.
					Hi str. low alloy, galv.
4.10[83]	4.90[83]	3.50[4,11]	SF, LA=4.25[24,62] F=4.75[19], S=4.50[62]	Atlanta=4.05[63] Minnequa=4.55[14] Ashland=3.50[7]	STRIP Hot-rolled
			F=6.30[19] LA=6.40[27]	New Haven=5.15[2], 5.85[58] Trenton=6.00[45]	Cold-rolled
		5.30[11]	F=6.20[19] SF, LA=6.05[62] S=6.30[62]		Hi str. low alloy, h.r.
			F=6.95[19]		Hi str. low alloy, c.r.
		$8.55[11]	SF=9.20[24]		TINPLATE Cokes, 1.25-lb base box (1.50 lb, add 25¢)
					Electrolytic 0.25, 0.50, 0.75 lb box
					BLACKPLATE, 29 gage Hollowware enameling
4.30[83]	4.10[83]	3.70[4,11]	SF, LA=4.40[24]	Atlanta=4.25[85] Minnequa=4.15[14]	BARS Carbon steel
4.30[83]	4.10[83]	3.70[4,11]	SF, S=4.45[62] F=4.40[19], LA=4.40[62]	Atlanta=4.25[85] Minnequa=4.50[14]	Reinforcing
			LA=6.00[4]	Newark=5.00[89] Putnam=5.10[89] Hartford=5.10[4]	Cold-finished
4.90[83]	4.70[83]		LA=5.35[62] F=5.35[19]		Alloy, hot-rolled
				Newark=5.75[89] Worcester=5.75[2] Hartford=5.85[4]	Alloy, cold-drawn
		5.55[11]	F=6.60[19] SF, S=6.30[62] LA=6.25[62]		Hi str. low alloy, h.r.
	4.10[83]	3.70[4,11]	F=4.30[19] S=4.60[62]	Claymont=4.15[29] Coatesville=4.15[21] Minnequa=4.50[14] Geneva=3.70[16]	PLATE Carbon steel
				Harrisburg=5.25[35]	Floor plates
			F=5.70[19]	Coatesville=5.25[21] Claymont=4.85[29]	Alloy
		5.65[11]	F=6.25[19] S=6.55[62]	Geneva=5.65[16]	Hi str. low alloy
4.25[83]	4.05[83]	3.60[4] 3.65[11]	SF=4.20[62] F=4.25[19] LA=4.25[24,62] S=4.30[62]	Geneva 3.65[16] Minnequa 4.10[14]	SHAPES, Structural
		5.50[11]	SF=6.10[62,19] SF=6.00[62] LA=6.05[62]	Geneva=5.50[16]	Si str. low alloy
5.45[83]	5.25[83]	4.85[4,11]	SF, LA=5.80[24]	Atlanta=5.10[85] Worcester=5.15[2] Minnequa=5.10[14] Portsmouth=5.25[20]	MANUFACTURERS' WIRE Bright

†Special coated mfg ternes deduct 95¢ from 1.25-lb coke base box price. Can-making quality blackplate, 55 to 128-lb, deduct $2.20 from 1.25-lb coke base box.

Key to Steel Producers

1 U. S. Steel Co., Pittsburgh
2 American Steel & Wire Co., Cleveland
3 Bethlehem Steel Co., Bethlehem
4 Republic Steel Corp., Cleveland
5 Jones & Laughlin Steel Corp., Pittsburgh
6 Youngstown Sheet & Tube Co., Youngstown
7 Armco Steel Corp., Middletown, Ohio
8 Inland Steel Co., Chicago
9 Weirton Steel Co., Weirton, W. Va.
10 National Tube Co., Pittsburgh
11 Tennessee Coal, Iron & R. R. Co., Birmingham
12 Great Lakes Steel Corp., Detroit
13 Sharon Steel Corp., Sharon, Pa.
14 Colorado Fuel & Iron Corp., Denver
15 Wheeling Steel Corp., Wheeling, W. Va.
16 Geneva Steel Co., Salt Lake City
17 Crucible Steel Co. of America, New York
18 Pittsburgh Steel Co., Pittsburgh
19 Kaiser Steel Corp., Oakland, Calif.
20 Portsmouth Div., Detroit Steel Corp., Detroit
21 Lukens Steel Co., Coatesville, Pa.
22 Granite City Steel Co., Granite City, Ill.
23 Wisconsin Steel Co., South Chicago, Ill.
24 Columbia Steel Co., San Francisco
25 Copperweld Steel Co., Glassport, Pa.
26 Alan Wood Steel Co., Conshohocken, Pa.
27 Colstrip Steel Corp., Los Angeles
28 Allegheny Ludlum Steel Corp., Pittsburgh
29 Claymont Steel Corp., Claymont, Del.
30 Continental Steel Corp., Kokomo, Ind.
31 Rotary Electric Steel Co., Detroit
32 Laclede Steel Co., St. Louis
33 Northwestern Steel & Wire Co., Sterling, Ill.
34 Keystone Steel & Wire Co., Peoria, Ill.
35 Central Iron & Steel Co., Harrisburg, Pa.
36 Carpenter Steel Co., Reading, Pa.
37 Eastern Stainless Steel Corp., Baltimore
38 Washington Steel Corp., Washington, Pa.
39 Jessop Steel Co., Washington, Pa.
40 Blair Strip Steel Co., New Castle, Pa.
41 Superior Steel Corp., Carnegie, Pa.
42 Timken Steel & Tube Div., Canton, Ohio
43 Babcock & Wilcox Tube Co., Beaver Falls, Pa.
44 Reeves Steel & Mfg. Co., Dover, Ohio
45 John A. Roebling's Sons Co., Trenton, N. J.
46 Simonds Saw & Steel Co., Fitchburg, Mass.
47 McLouth Steel Corp., Detroit
48 Cold Metal Products Co., Youngstown
49 Thomas Steel Co., Warren, Ohio
50 Wilson Steel & Wire Co., Chicago
51 Sweet's Steel Co., Williamsport, Pa.
52 Superior Drawn Steel Co., Monaca, Pa.
53 Tremont Nail Co., Wareham, Mass.
54 Firth Sterling St. & Carbide Corp., McKeesport
55 Ingersoll Steel Div., Chicago
56 Phoenix Iron & Steel Co., Phoenixville, Pa.
57 Fitzsimons Steel Co., Youngstown
58 Stanley Works, New Britain, Conn.
59 Universal-Cyclops Steel Corp., Bridgeville, Pa.
60 American Cladmetals Co., Carnegie, Pa.
61 Cuyahoga Steel & Wire Co., Cleveland
62 Bethlehem Pacific Coast Steel Corp., San Fran.
63 Follansbee Steel Corp., Pittsburgh
64 Niles Rolling Mill Co., Niles, Ohio
65 Atlantic Steel Co., Atlanta
66 Acme Steel Co., Chicago
67 Joslyn Mfg. & Supply Co., Chicago
68 Detroit Steel Corp., Detroit
69 Wycoff Steel Co., Pittsburgh
70 Bliss & Laughlin, Inc., Harvey, Ill.
71 Columbia Steel & Shafting Co., Pittsburgh
72 Cumberland Steel Co., Cumberland, Md.
73 La Salle Steel Co., Chicago
74 Monarch Steel Co., Inc., Hammond, Ind.
75 Empire Steel Co., Mansfield, Ohio
76 Mahoning Valley Steel Co., Niles, Ohio
77 Oliver Iron & Steel Co., Pittsburgh
78 Pittsburgh Screw & Bolt Co., Pittsburgh
79 Standard Forging Corp., Chicago
80 Driver Harris Co., Harrison, N. J.
81 Detroit Tube & Steel Div., Detroit
82 Reliance Div., Eaton Mfg. Co., Massillon, Ohio
83 Sheffield Steel Corp., Kansas City
84 Plymouth Steel Co., Detroit
85 Wickwire Spencer Steel, Buffalo
86 Angell Nail and Chaplet, Cleveland
87 Mid-States Steel & Wire, Crawfordsville, Ind.
88 National Supply, Pittsburgh, Pa.
89 Wheatland Tube Co., Wheatland, Pa.
90 Mercer Tube & Mfg. Co., Sharon, Pa.
91 Woodward Iron Co., Woodward, Ala.
92 Sloss-Sheffield Steel & Iron Co., Birmingham
93 Hanna Furnace Corp., Detroit
94 Interlake Iron Corp., Cleveland
95 Lone Star Steel Co., Dallas
96 Mystic Iron Works, Everett, Mass.
97 Jackson Iron & Steel Co., Jackson, O.
98 Globe Iron Co., Jackson, O.
99 Pittsburgh Coke & Chemical Co., Pittsburgh
100 Shenango Furnace Co., Pittsburgh
101 Tennessee Products & Chem. Corp., Nashville
102 Koppers Co., Inc., Granite City, Ill.
103 Page Steel & Wire Div., American Chain & Cable, Monessen, Pa.
104 Wallingford Steel Co., Wallingford, Conn.

STAINLESS STEELS

Base price, cents per lb, f.o.b. mill.

Product	301	302	303	304	316	321	347	410	416	430
Ingots, rerolling	14.25	15.00	16.50	16.00	24.25	19.75	21.50	12.75	14.75	13.00
Slabs, billets rerolling	18.50	19.75	21.75	20.75	31.75	26.00	28.25	16.50	20.00	16.75
Forg. discs, die blocks, rings	34.00	34.00	36.50	35.50	52.50	40.00	44.50	28.00	28.50	28.50
Billets, forging	26.25	26.25	28.25	27.50	41.00	31.00	34.75	21.50	22.00	22.00
Bars, wires, structurals	31.25	31.25	33.75	32.75	48.75	36.75	41.25	25.75	26.25	26.25
Plates	33.00	33.00	35.00	35.00	51.50	40.50	45.00	27.00	27.50	27.50
Sheets	41.00	41.00	43.00	43.00	56.50	49.00	53.50	36.50	37.00	39.00
Strip, hot-rolled	26.50	28.00	32.25	30.00	48.25	36.75	41.00	23.50	30.25	24.00
Strip, cold-rolled	34.00	36.50	40.00	38.50	58.50	48.00	52.00	30.50	37.00	31.00

STAINLESS STEEL PRODUCING POINTS—*Sheets:* Midland, Pa., 17; Brackenridge, Pa., 28; Butler, Pa., 7; McKeesport, Pa., 1; Washington, Pa., 38 (type 316 add 5¢), 39; Baltimore, 37; Middletown, Ohio, 7; Massillon, Ohio, 4; Gary, 1; Bridgeville, Pa., 59; New Castle, Ind., 55; Ft. Wayne, Ind, 67; Lockport, N. Y., 45.

Strip: Midland, Pa., 17; Cleveland, 2; Carnegie, Pa., 41; McKeesport, Pa., 54; Reading, Pa., 36; Washington, Pa., 38 (type 316 add 5¢); W. Leechburg, Pa., 28; Bridgeville, Pa., 59; Detroit, 47; Massillon, Canton, Ohio, 4; Middletown, Ohio, 7; Harrison, N. J., 80; Youngstown, 48; Lockport, N. Y., 46; New Britain, Conn., 58; Sharon, Pa., 13; Butler, Pa., 7; Wallingford, Conn., 104.

Bars: Baltimore, 7; Duquesne, Pa., 1; Munhall, Pa., 1; Reading, Pa., 36; Titusville, Pa., 59; Washington, Pa., 39; McKeesport, Pa., 1, 54; Bridgeville, Pa., 59; Dunkirk, N. Y., 28; Massillon, Ohio, 4; Chicago, 1; Syracuse, N. Y., 17; Watervliet, N. Y., 28; Waukegan, Ill., 2; Lockport, N. Y., 46; Canton, Ohio, 42; Ft. Wayne, Ind., 67.

Wire: Waukegan, Ill., 2; Massillon, Ohio, 4; McKeesport, Pa., 54; Bridgeport, Conn., 44; Ft. Wayne, Ind., 67; Trenton, N. J., 45; Harrison, N. J., 80; Baltimore, 7; Dunkirk, 28; Monessen, 103; Syracuse, N. Y., 17; Bridgeville, Pa., 59.

Structurals: Baltimore, 7; Massillon, Ohio, 4; Chicago, 1, 67; Watervliet, N. Y., 28; Bridgeport, Conn., 44; Syracuse, N. Y., 17.

Plates: Brackenridge, Pa., 28 (type 416 add ½¢); Butler, Pa., 7; Chicago, 1; Munhall, Pa., 1; Midland, Pa., 17; New Castle, Ind., 55; Lockport, N. Y., 46; Middletown, 7; Washington, Pa., 39; Cleveland, Massillon, 4.

Forged discs, die blocks, rings: Pittsburgh, 1, 17; Syracuse, 17; Ferndale, Mich., 28; Washington, Pa., 39.

Forging billets: Midland, Pa., 17; Baltimore, 7; Washington, Pa., 39; McKeesport, 54; Massillon, Canton, Ohio, 4; Watervliet, 28; Pittsburgh, Chicago, 1; Syracuse, N. Y., 17.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Axles	Screw Spikes	Tie Plates	Track Bolts Treated
Bessemer-1	3.60	4.00	4.70					
Chicago-4				6.15				
Ensley-11	3.60	4.00						
Fairfield-11		4.00	4.40			8.60	4.50	
Gary-1	3.60	4.00					4.50	
Ind. Harbor-8	3.60		4.70	6.15	5.60	8.60	4.50	
Johnstown-3		4.00			5.60	9.60		
Joliet-1		4.00	4.70					
Kansas City-83				6.40				9.85
Lackawanna-3	3.60	4.00	4.70			8.60	4.50	
Lebanon-3				6.15				9.85
Minnequa-14	3.60	4.50	4.70	6.15		8.60	4.50	9.85
Pittsburgh-77						9.35		9.85
Pittsburgh-78								9.85
Pittsburgh-5				6.15				
Pittsburgh-24							4.65	
Seattle-62				6.65			4.65	
Steelton-3	3.60		4.70				4.50	
Struthers-6				6.15				
Torrance-24							4.65	
Youngstown-4				6.15				

BOILER TUBES

$ Per 100 ft., cut, 10 to 24 ft

F.o.b. Mill	Size		Seamless		Elec. Weld	
	OD-In.	B.W. Ga.	H.R.	C.D.	H.R.	C.D.
Babcock & Wilcox	2	13	22.67	26.66	21.99	25.86
	2½	12	30.48	35.84	29.57	34.76
	3	12	33.90	39.90	32.89	38.70
	3½	11	42.37	49.89	41.10	48.39
	4	10	52.60	61.88	51.03	60.02
National Tube	2	13	21.62	26.48		
	2½	12	29.65	36.32		
	3	12	34.00	41.64		
	3½	11	40.34	49.41		
	4	10	51.21	62.72		
Pittsburgh Steel	2	13		27.08		
	2½	12	30.49	37.15		
	3	12	34.95	42.59		
	3½	11	41.48	50.54		
	4	10	52.65	64.16		

FLUORSPAR

Washed gravel, f.o.b. Rosiclaire, Ill. Price, net ton; Effective CaF_2 content:
70% or more $43.00
60% or less 40.00

CAST IRON WATER PIPE

Per Net Ton

6 to 24-in., del'd Chicago. $105.30 to $108.80
6 to 24-in., del'd N. Y. 108.50 to 109.50
6 to 24-in., Birmingham. 91.50 to 96.00
6-in and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipment; rail and water shipment less ..... 123.00 to 130.00
Class "A" and as pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails Base Col.	Woven Wire Fence 9-15½ ga. Base Col.	Fence Posts Base Col.	Single Loop Bale Ties Base Col.	Twisted Barbless Wire Base Col.	Gal. Barbed Wire Base Col.	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Gal. (1) ¢/lb.
Alabama City-4	118	126		123		136	5.70	5.95
Aliquippa, Pa.-5	118	132			136	140	5.70	6.15
Atlanta-65	121	133		126	126	143	5.95	6.40
Bartonville-34	118	130		123	143	143	5.70	6.15
Buffalo-85							4.85	
Cleveland-86	125							
Cleveland-2							5.70	6.15
Crawfordsville-87		132				145	5.95	6.40
Donora, Pa.-2	118	130		123	140	140	5.70	6.15
Duluth-2	118	130		123	140	140	5.70	6.15
Fairfield, Ala.-11	118	130		123		140	5.70	6.15
Houston-83	126	138				148	6.10	6.55
Johnstown, Pa.-3	118	130			140		5.70	6.15
Joliet, Ill.-2	118	130		123		140	5.70	6.15
Kokomo, Ind.-30	120	132		125	138	142	5.80	6.05
Los Angeles-62							6.65	
Kansas City-83	130			135		152	6.30	6.75
Minnequa-14	123	138	130	128	146	146	5.95	6.45
Monessen-18	124	135				145	5.95	6.40
Moline, Ill.-4			136					
Pittsburg, Cal.-24	137			147	156	160	6.65	6.80
Portsmouth-20	124	137			147	147	6.10	6.60
Rankin, Pa.-2	118	130			140	140	5.70	6.15
So. Chicago, Ill.-4	118	126	140	123		136	5.70	5.95
S. San Fran.-14				147		160	6.65	7.10
Sparrows Pt.-3	120			125	142	142	5.80	6.25
Sterling, Ill.-33	118	130		123	140	140	5.70	6.15
Struthers, Ohio-6							5.70	6.15
Torrance, Cal.-24	138						6.65	
Worcester-2	124						6.00	6.45
Williamsport, Pa.-51			150					

Cut Nails, carloads, base, $7.35 per 100 lb (less 20¢ to jobbers), at Conshohocken, Pa., (26), Wheeling, W. Va., (15), $7.15.

(1) Alabama City and So. Chicago do not include zinc extra.

PIPE AND TUBING

Base discounts, f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS					
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½-3 In.		3½-4In.	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
STANDARD T. & C.																				
Sparrows Pt.-3	34.0	12.0	37.0	16.0	39.5	19.5	40.0	20.0	40.5	21.0	41.0	21.5	41.5	22.0						
Cleveland-4	36.0	14.0	39.0	18.0	41.5	21.5	42.9	22.0	42.5	23.0	43.0	23.5	43.5	24.0						
Oakland-19	25.0	3.0	28.0	7.0	30.5	10.5	31.0	11.0	31.5	12.0	32.0	12.5	32.5	13.0						
Pittsburgh-5	36.0	14.0	39.0	17.0	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	29.5	8.0	32.5	11.5	34.5	13.5
Pittsburgh-10	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5	9.5	32.5	12.5	34.5	14.5
St. Louis-32	35.0	13.0	38.0	17.0	40.5	20.5	41.0	21.0	41.5	22.0	42.0	22.5	42.5	23.0						
Sharon-90	36.0	13.0	39.0	17.0	41.5	20.0	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.0						
Pittsburgh-88	36.0	14.0	39.0	18.0	41 5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5		32.5		34.5	
Wheeling-15	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0						
Wheatland-89	36.0	14.0	39.0	17.0	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5						
Youngstown-6	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5	9.5	32.5	12.5	34.5	14.5
EXTRA STRONG, PLAIN ENDS																				
Sparrows Pt.-3	33.5	13.0	37.5	17.0	39.5	20.5	40.0	21.0	40.5	22.0	41.0	22.5	41.5	23.0						
Cleveland-4	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0						
Oakland-19	24.5	4.0	28.5	8.0	30.5	11.5	31.0	12.0	31.5	13.0	32.0	13.5	32.5	14.0						
Pittsburgh-5	35.5	13.5	39.5	17.5	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	29.0	7.5	33.0	12.0	36.5	15.5
Pittsburgh-10	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	29.0	10.0	33.0	14.0	36.5	17.5
St. Louis-32	34.5	14.0	38.5	18.0	40.5	21.5	41.0	22.0	41.5	23.0	42.0	23.5	42.5	24.0						
Sharon-90	35.5	14.0	39.5	18.0	41.5	21.0	42.0	21.5	42.5	22.0	43.0	22.5	43.5	23.0						
Pittsburgh-88	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	29.0		33.0		36.5	
Wheeling-15	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0						
Wheatland-89	35.5	13.5	39.5	17.5	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5						
Youngstown-6	35.5	15.0	39.5	9.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	26.0	29.0	10.0	33.0	14.0	36.5	17.5

Galvanized discounts based on zinc at 17¢ per lb, East St. Louis. For each 1¢ change in zinc, discounts vary as follows: ½ in., ¾ in., and 1 in., 1 pt.; 1¼ in., 1½ in., 2 in., ¾ pt.; 2½ in., 3 in., ½ pt. Calculate discounts on even cents per lb of zinc, i.e., if zinc is 16.51¢ to 17.50¢ per lb, use 17¢. Jones & Laughlin discounts apply only when zinc price changes 1¢. Threads only, buttweld and seamless, 1 pt. higher discount. Plain ends, buttweld and seamless, 3 in. and under, 3½ pts. higher discount. Buttweld jobbers' discount, 5 pct.

WAREHOUSES

Base price, f.o.b., dollars per 100 lb. *(Metropolitan area delivery add 20¢ except Birmingham, San Francisco, Cincinnati, New Orleans, St. Paul, add 15¢; Memphis, add 10¢; Philadelphia, add 25¢; New York, add 30¢).

Cities	Sheets			Strip		Plates	Shapes	Bars		Alloy Bars			
	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled A 4615 As rolled	Hot-Rolled A 4140 Annealed	Cold-Drawn A 4615 As rolled	Cold-Drawn A 4140 Annealed
Baltimore	5.60	6.84	7.49[2]–8.07	6.04	.....	5.80	6.14	6.04	6.84–6.89	10.24	10.54	11.89	12.19
Birmingham*	5.60	6.40	6.75	5.55	.....	5.95	5.70	5.55	.....	.....	.....	.....	.....
Boston	6.20	7.00–7.25	7.74–8.29	6.15	8.50[4]	6.48–6.78	6.20	6.05	6.79–6.84	10.25	10.55	11.90–12.00	12.20–12.30
Buffalo	5.80	6.40	7.74–8.09	5.86	.....	6.05	5.80	5.60	6.40–6.45	10.15–10.85	10.45	11.80	11.95–12.10
Chicago	5.60	6.40	7.75	5.55	.....	5.80	5.70	5.55	6.30	9.80	10.10	11.45	11.75
Cincinnati*	5.87	6.44	7.39	5.80	.....	6.19	6.09	5.80	6.61	10.15	10.45	11.80	12.10
Cleveland	5.60	6.40	8.10	5.69	6.90	5.92	5.82	5.57	6.40	9.91	10.21	11.56	11.86
Detroit	5.78	6.53	7.89	5.84	.....	5.99	6.09	5.84	6.56	10.11	10.41	11.76	12.06
Houston	7.00	8.25	.....	.....	.....	6.85	6.50	6.85	9.35	10.35	11.25	.....	12.75
Indianapolis, del'd.	6.00	6.80	8.15	5.95	.....	6.20	6.10	5.95	6.80	.....	.....	.....	.....
Kansas City	6.00	6.80	7.45	6.13	7.50	6.40	6.30	6.15	7.00	10.40	10.70	12.05	12.35
Los Angeles	6.35	7.90	8.85	6.40	9.45[6]	6.40	6.35	6.35	8.20	11.30	11.30	13.20	13.50
Memphis*	6.33–6.38	7.08–7.18	.....	6.33–6.38	.....	6.43–8.02	6.33–6.48	6.08–6.33	7.18–7.32	.....	.....	.....	.....
Milwaukee	5.74	6.54	7.89	5.69–6.59	.....	5.94	5.84	5.69	6.44–6.54	9.94	10.24	11.59	11.89
New Orleans*	5.70	6.59	.....	5.75	7.25	5.95	5.75	5.75	7.30	.....	.....	.....	.....
New York*	5.67–5.97	7.19[5]–7.24[1]	8.14[2]	6.29–6.89	8.63[4]	6.28–6.58	6.10	6.12	6.99	10.05–10.15	10.35–10.45	11.70–11.80	12.10–12.20
Norfolk	6.50[3]	.....	.....	.....	.....	6.50[3]	6.60[3]	6.55[3]	.....	.....	.....	.....	.....
Philadelphia*	5.90	6.80	8.00	6.10	.....	6.05	5.90	6.05	6.86	9.90	10.20	.....	.....
Pittsburgh	5.60	6.40	7.75	5.65–5.95	.....	5.75	5.70	5.55	6.15	9.80	10.10	11.45	11.75
Portland	6.60–7.55	8.95	8.50–9.10	7.30	.....	6.80	6.95	6.90	.....	.....	12.15	.....	.....
Salt Lake City	7.95	.....	9.70–10.50[2]	8.70–8.75	.....	8.05	6.75–8.30	7.95–8.65	9.00	.....	.....	.....	.....
San Francisco*	6.65	8.05[2]	8.55–8.90[2]	6.60	9.95[6]	6.50	6.45	6.45	8.20	11.30	11.30	13.20	13.20–13.50
Seattle	7.05	8.60	9.20	9.05	.....	6.75	6.65	6.75	9.05	.....	.....	.....	.....
St. Louis	5.80–5.85	6.65	8.00	5.80	8.00[4]–8.28	6.13	6.03	5.80	6.55–6.65	10.05	10.35	11.70	12.00
St. Paul*	6.16	6.96	8.31	6.11	.....	6.38	6.26	6.11	6.96	10.38	10.68	12.01	12.31

BASE QUANTITIES (Standard unless otherwise keyed): Cold finished bars; 2000 lb or over. Alloy bars; 1000 to 1999 lb. All others; 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets, for quantity.

EXCEPTIONS: (1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 400 to 1999 lb; (4) 6000 lb and over; (5) 1500 to 9999 lb; (6) 2000 to 5999 lb.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Foundry	Malleable	Bessemer	Low Phos.	Blast Furnace Silvery	Low Phos. Charcoal
Bethlehem-3	54.00	54.50	55.00	55.50	.....	.....	.....
Birmingham-4	48.38	48.88	.....	.....	.....	.....	.....
Birmingham-91	48.38	48.88	.....	.....	.....	.....	.....
Birmingham-92	48.38	48.88	.....	.....	.....	.....	.....
Buffalo-4	52.00	52.50	53.00	.....	.....	.....	.....
Buffalo-93	52.00	52.50	53.00	.....	.....	63.75	.....
Chicago-94	52.00	52.50	52.50	53.00	.....	.....	.....
Cleveland-2	52.00	52.50	52.50	53.00	57.00	.....	.....
Cleveland-4	52.00	52.50	52.50	.....	.....	.....	.....
Daingerfield, Tex.-95	48.00	48.50	48.50	.....	.....	.....	.....
Duluth-94	52.00	52.50	52.50	53.00	.....	.....	.....
Erie-94	52.00	52.50	52.50	53.00	.....	.....	.....
Everett, Mass.-96	.....	51.75	52.25	.....	.....	.....	.....
Fontana-19	58.00	58.50	.....	.....	.....	.....	.....
Geneva, Utah-18	52.00	52.50	52.50	53.00	.....	.....	.....
Granite City, Ill.-102	53.90	54.40	54.90	.....	.....	.....	.....
Hubbard, Ohio-6	52.00	52.50	52.50	.....	.....	.....	.....
Ironton, Utah-16	52.00	52.50	.....	.....	.....	.....	.....
Jackson, Ohio-97, 98	.....	.....	.....	.....	.....	62.50	.....
Lyle, Tenn.-101	.....	.....	.....	.....	.....	.....	66.00
Monessen-18	54.00	.....	.....	.....	.....	.....	.....
Neville Island-99	52.00	52.50	52.50	53.00	.....	.....	.....
Pittsburgh-1	52.00	.....	.....	53.00	.....	.....	.....
Sharpsville-100	52.00	52.50	52.50	53.00	.....	.....	.....
Steelton-3	54.00	54.50	55.00	55.50	60.00	.....	.....
Swedeland-26	56.00	56.50	57.00	57.50	.....	.....	.....
Toledo-94	52.00	52.50	52.50	53.00	.....	.....	.....
Troy, N. Y.-4	54.00	54.50	55.00	.....	60.00	.....	.....
Youngstown-6	52.00	52.50	52.50	53.00	.....	.....	.....

DIFFERENTIALS: Add 50¢ per ton for each 0.25 pct silicon over base (1.75 to 2.25 pct, except low phos. 1.75 to 2.00 pct), 50¢ per ton for each 0.50 pct manganese over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Subtract 38¢ per ton for phosphorus, content 0.70 pct and over. Silvery Iron: Add $1.50 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. $1 per ton for 0.75 pct or more phosphorus, manganese as above. Bessemer ferrosilicon prices are $1 over comparable silvery iron.

REFRACTORIES

Fire Clay Brick *(F.o.b. works) Carloads, Per 1000*

First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5)	$94.60
No. 1 Ohio	88.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	88.00
No. 2 Ohio	79.20
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50)	13.75

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$94.60
Childs, Pa.	99.00
Hays, Pa.	100.10
Chicago District	104.50
Western Utah and Calif.	111.10
Super Duty, Hays, Pa., Athens, Tex., Chicago	111.10
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	16.50
Silica cement, net ton, bulk, Hays, Pa.	18.70
Silica cement, net ton, bulk, Ensley, Ala.	17.60
Silica cement, net ton, bulk, Chicago District	17.60
Silica cement, net ton, bulk, Utah and Calif.	24.70

Chrome Brick *Per Net Ton*

Standard chemically bonded, Balt., Chester	$82.00

Magnesite Brick

Standard, Baltimore	$104.00
Chemically bonded, Baltimore	93.00

Grain Magnesite *St. ⅜-in. grains*

Domestic, f.o.b. Baltimore, in bulk fines removed	$62.70
Domestic, f.o.b. Chewelah, Wash., in bulk	36.30
in sacks	41.80

Dead Burned Dolomite

F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk Midwest, add 10¢; Missouri Valley, add 20¢	$13.00

COKE

Furnace, beehive (f.o.b. oven) Connellsville, Pa.	Net Ton $14.50 to $15.00
Foundry, beehive (f.o.b. oven) Connellsville, Pa.	$17.50 to $18.00
Foundry, oven coke	
Buffalo, del'd	$26.69
Chicago, f.o.b.	23.00
Detroit, f.o.b.	24.00
New England, del'd	24.80
Seaboard, N. J., f.o.b.	22.75
Philadelphia, f.o.b.	22.70
Swedeland, Pa., f.o.b.	22.60
Painesville, Ohio, f.o.b.	24.00
Erie, Pa., f.o.b.	23.50
Cleveland, del'd	25.72
Cincinnati, del'd	25.06
St. Paul, f.o.b.	22.50
St. Louis	25.40
Birmingham, del'd	21.69
Neville Island	23.00

LAKE SUPERIOR ORES

(51.50% Fe; natural content, delivered lower lake ports) *Per gross ton*

Old range, bessemer	$8.70
Old range, nonbessemer	8.55
Mesabi, bessemer	8.45
Mesabi, nonbessemer	8.30
High phosphorus	8.30

After adjustments for analyses, prices will be increased or decreased as the case may be for increases or decreases after Dec. 2, 1950, in lake vessel rates, upper lake rail freights, dock handling charges and taxes thereon.

C-R SPRING STEEL

F.o.b. Mill Cents Per Lb.	CARBON CONTENT				
	0.26–0.40	0.41–0.60	0.61–0.80	0.81–1.05	1.06–1.35
Bridgeport, Conn.-58	5.35	6.80	7.40	9.35	11.65
Carnegie, Pa.-41	.....	6.80	7.40	9.35	11.65
Cleveland-2	4.65	5.45	7.40	9.35	11.65
Detroit-68	5.60	6.65	7.25	.....	.....
New Castle, Pa.-40	5.35	6.80	7.40	9.35	.....
New Haven, Conn.-68	5.85	6.75	7.35	.....	.....
Sharon, Pa.-13	5.35	6.80	7.40	9.35	11.65
Weirton, W. Va.-9	5.35	6.80	7.40	9.35	11.65
Worcester, Mass.-2	4.95	6.75	7.70	9.65	11.65
Youngstown-48	.....	6.90	7.40	9.35	11.65

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It's Easy...with WITTEK Roll Feeds and Reel Stands

Wittek Roll Feeds handle any type of coiled strip stock and are made in single roll, double roll, and compound types with straighteners, in models to feed in any of four directions. They are reliable and accurate with simple, quick adjustment of feed length. Standard sizes and models meet a wide variety of press size and capacity conditions.

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EASTON CAR & CONSTRUCTION COMPANY - EASTON, PA. - NEW YORK - PHILADELPHIA - PITTSBURGH

BOLTS, NUTS, RIVETS, SCREWS

Consumer Prices

(Base discount, f.o.b. mill, Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts

	Pct Off List Less Case	C.
½ in. & smaller x 6 in. & shorter	15	28½
9/16 in. & ⅝ in. x 6 in. & shorter	18½	30½
¾ in. & larger x 6 in. & shorter	17½	29½
All diam. longer than 6 in.	14	27½
Lag, all diam. x 6 in. & shorter	23	35
Lag, all diam. longer than 6 in.	21	33
Plow bolts	34	....

Nuts, Hot Pressed, Cold Punched—Sq

	Pct Off List Less Keg (Reg.)	K.	Less Keg (Hvy.)	K.
½ in. & smaller.	15	28½	15	28½
9/16. in. & ⅝ in..	12	25	6½	21
¾ in. to 1½ in. inclusive	9	23	1	16½
1⅝ in. & larger.	7½	22	1	16½

Nuts, Hot Pressed—Hexagon

½ in. & smaller.	26	37	22	34
9/16 in. & ⅝ in..	16½	29½	6½	21
¾ in. to 1½ in. inclusive	12	25	2	17½
1⅝ in. & larger.	8½	23	2	17½

Nuts, Cold Punched—Hexagon

½ in. & smaller.	26	37	22	34
9/16 in. & ⅝ in..	23	35	17½	30½
¾ in. to 1½ in. inclusive	19½	31½	12	25
1⅝ in. & larger.	12	25	6½	21

Nuts, Semi-Finished—Hexagon

	Reg.		Hvy.	
½ in. & smaller.	35	45	28½	39½
9/16 in. & ⅝ in..	29½	40½	22	34
¾ in. to 1½ in. inclusive	24	36	15	28½
1⅝ in. & larger.	13	26	8½	23

	Light	
7/16 in. & smaller	35	45
½ in. thru ⅝ in.	28½	39½
¾ in. to 1½ in. inclusive	26	37

Stove Bolts

	Pct Off List
Packaged, steel, plain finished	48—10
Packaged, plated finish	31—10
Bulk, plain finish**	62*

*Discounts apply to bulk shipments in not less than 15,000 pieces of a size and kind where length is 3-in. and shorter; 5000 pieces for lengths longer than 3-in. For lesser quantities, packaged price applies.

**Zinc, Parkerized, cadmium or nickel plated finishes add 6¢ per lb net. For black oil finish, add 2¢ per lb net.

Rivets

	Base per 100 lb.
½ in. & larger.....	$7.35
	Pct Off List
7/16 in. & smaller.....	36

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham, Lebanon, Pa.

Cap and Set Screws

(In bulk)

	Pct Off List
Hexagon head cap screws, coarse or fine thread, ¼ in. thru ⅝ in. x 6 in., SAE 1020, bright.....	54
¾ in. thru 1 in. up to & including 6 in.	48
¼ in. thru ⅝ in. x 6 in. & shorter high C double heat treat.....	46
¾ in. thru 1 in. up to & including 6 in.	41
Milled studs	38
Flat head cap screws, listed sizes....	10
Fillister head cap, listed sizes.....	34
Set screws, sq head, cup point, 1 in. diam and smaller x 6 in. & shorter	53

S. M. Ferrochrome

Contract price, cents per pound, chromium contained, lump size, delivered.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads	21.60
Ton lots	23.75
Less ton lots	25.25

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

Carloads	27.75
Ton lots	30.05
Less ton lots	31.85

ELECTRODES

Cents per lb., f.o.b. plant threaded electrodes with nipples, unbozed

Diam. in in.	Length in in.	Cents Per lb.
	GRAPHITE	
17, 18, 20	60, 72	17.85
8 to 16	48, 60, 72	17.85
7	48, 60	19.57
6	48, 60	20.95
4, 5	40	21.50
3	40	22.61
2½	24, 30	23.15
2	24, 30	25.36
	CARBON	
40	100, 110	8.03
35	65, 110	8.03
30	65, 84, 110	8.03
24	72 to 104	8.03
20	84, 90	8.03
17	60, 72	8.03
14	60, 72	8.57
10, 12	60	8.84
8	60	9.10

CLAD STEEL

Base prices, cents per pound, f.o.b. mill

Stainless-carbon	Plate	Sheet
No. 304, 20 pct.		
Coatesville, Pa. (21)	*29.5	
Washgtn, Pa. (39)	*29.5	
Claymont, Del. (29)	*28.00	
Conshohocken, Pa. (26)		*24.00
New Castle, Ind. (55)	*26.50	*25.50
Nickel-carbon		
10 pct Coatesville (21)	32.5	
Inconel-carbon		
10 pct Coatesville (21)	40.5	
Monel-carbon		
10 pct Coatesville (21)	33.5	
No. 302 Stainless-copper stainless, Carnegie, Pa. (60)		77.00
Aluminized steel sheets, hot dip, Butler, Pa. (7)		7.75

*Includes annealing and pickling, or sandblasting.

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	$1.235
18	4	1	—	5	$1.36
18	4	2	—	—	$1.38
1.5	4	1.5	8	—	78.5¢
6	4	2	6	—	87¢

High-carbon chromium ..... 63.5¢
Oil hardened manganese..... 35¢
Special carbon ..... 32.5¢
Extra carbon ..... 27¢
Regular carbon ..... 23¢

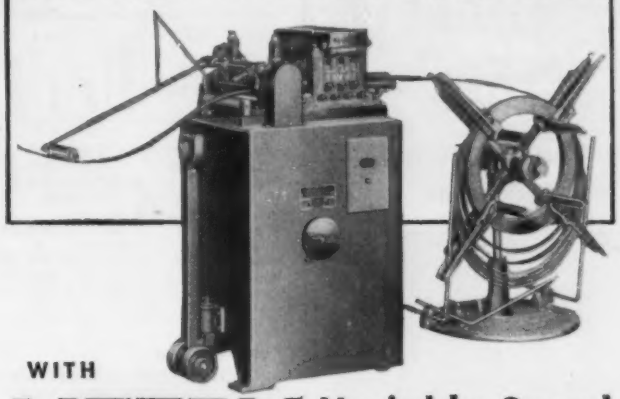
Warehouse prices on and east of Mississippi are 3.5¢ per lb higher. West of Mississippi, 5.5¢ higher.

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.l.f. New York, ocean bags .. 7.4¢ to 9.0¢
Canadian sponge iron, del'd In East ..... 10.00¢
Domestic sponge iron, 98+% Fe, carload lots ..... 15.5¢ to 17.0¢
Electrolytic iron, annealed, 99.5+% Fe ..... 42.5¢
Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe 53.5¢
Hydrogen reduced iron, minus 300 mesh, 98+% Fe 63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 micron, 98%, 99.8+% Fe 83.0¢ to $1.48
Aluminum ..... 31.5¢
Brass, 10 ton lots ..... 30.00¢ to 33.25¢
Copper, electrolytic. 10.75¢ plus metal value
Copper, reduced ...10.00¢ plus metal value
Cadmium, 100-199 lb. .95¢ plus metal value
Chromium, electrolytic, 99% min., and quantity, del'd $3.50
Lead .....7.5¢ to 12.0¢ plus metal value
Manganese ..... 57.0¢
Molybdenum, 99% $2.75
Nickel, unannealed ..... 88.0¢
Nickel, annealed ..... 95.0¢
Nickel, spherical, unannealed 92.0¢
Silicon ..... 38.5¢
Solder powder..7.0¢ to 9.0¢ plus met. value
Stainless steel, 302 ..... 83.00¢
Stainless steel, 316 ..... $1.10
Tin .....14.00¢ plus metal value
Tungsten, 99% (65 mesh) .. $6.00
Zinc, 10 ton lots ..... 23.0¢ to 30.5¢

STRAIGHTEN COIL STOCK FOR PRESSES, SHEARS OR SLITTERS



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Output rises, costs drop when coil stock is fed to the press, the shear, or the slitter through a Littell Straightening Machine. Coil stock comes out of a Littell Straightener flat, with curvature removed. Equipped with variable speed transmissions, Littell Straighteners are easily adjusted to meet a wide range of speed requirements. Thirteen medium and heavy duty models straighten coil stock of all standard widths and thickness.

F. J. LITTELL MACHINE CO.

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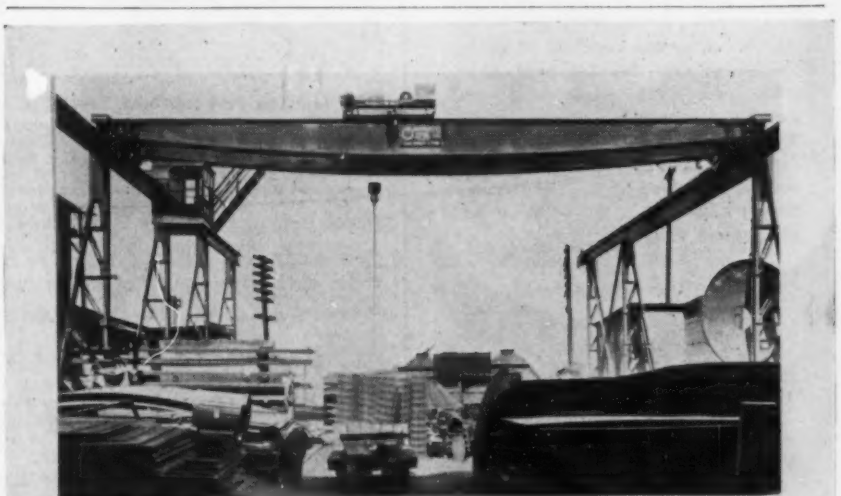

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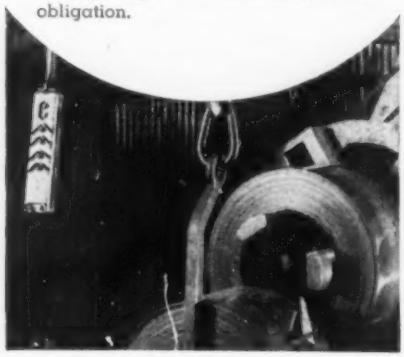
Modern materials handling is working wonders in reducing production costs these days. Chances are, a Reading Engineer can suggest ways to do the same in your plant if you give him the opportunity to personally analyze your operations. Simply drop us a line—there's no obligation.



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OVERHEAD TRAVELING CRANES

READING CRANES

ELECTRICAL SHEETS

22 Ga. H-R cut lengths

F.o.b. Mill Cents Per Lb.	Armature	Elec.	Motor	Dynamo	Transf. 72	Transf. 65	Transf. 58
Beech-Bottom-15		7.25	8.50	9.30	9.85	10.40	11.10
Brackenridge-28		7.25	8.50	9.30	9.85		
Follansbee-63	6.75	7.25	8.50	9.30	9.85	10.40	11.10
Granity City-22		7.95	9.20				
Ind. Harbor-3	6.75	7.25					
Mansfield-75	7.25	7.75	9.00	9.80			
Niles, O.-64	7.05	7.55					
Vandergrift-1	6.75	7.25	8.50	9.30	9.85	10.40	11.10
Warren, O.-4	6.75	7.25	8.50	9.30	9.85	10.40	11.10
Zanesville-7	6.75	7.25	8.50	9.30	9.85	10.40	11.10

Ferrochrome

Contract prices, cents per pound, contained Cr, lump size, bulk, in carloads, delivered. (65-72% Cr, 2% max. Si.)

0.06% C	30.50	0.20% C	29.50
0.10% C	30.00	0.50% C	29.25
0.15% C	29.75	1.00% C	29.00
2.00% C			28.75
65-69% Cr, 4-9% C			22.00
62-66% Cr, 4-6% C, 6-9% Si.			22.60

Foundry Ferrochrome

Contract prices, cents per lb of alloy. Noncontract prices add 2.50¢ per lb.

High carbon 8 Mesh and down.

62 to 66% Cr, 5 to 7% C, 7 to 10% Si.

Carloads, bulk	23.25
Carloads, packed	24.15
Ton lots, packed	27.25

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots. 97% min. Cr, 1% max. Fe.

0.10% max. C.	$1.14
0.50% max. C.	1.10
9 to 11% C.	1.08

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-49%, C 0.05% max.) Contract price, carloads, f.o.b. Niagara Falls, freight allowed; lump 4-in. x down, bulk 2-in. x down, 21.75¢ per lb of contained Cr plus 12.00¢ per lb of contained Si.

Bulk 1-in. x down, 21.90¢ per lb contained Cr plus 12.20¢ per lb contained Si.

Calcium-Silicon

Contract price per lb of alloy, dump, delivered.

30-33% Ca, 60-65% Si, 3.00% max. Fe.

Carloads	19.00
Ton lots	22.10
Less ton lots	23.60

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	20.00
Ton lots	22.30
Less ton lots	23.30

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn.

Ton lots	16.50¢
Less ton lots	17.75¢

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	18.00¢
Ton lots to carload packed	19.00¢
Less ton lots	20.50¢

SMZ

Contract price, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

Ton lots	17.50
Less ton lots	19.50

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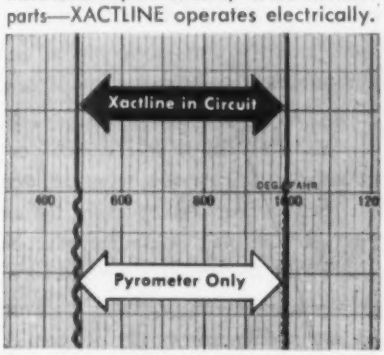
Automatic "STRAIGHT-LINE" TEMPERATURE CONTROL with XACTLINE

ELIMINATE
Overshooting
Undershooting

Are you going to continue to put up with that troublesome overshooting and undershooting inherent in your conventional pyrometer control—especially when it is so easy to eliminate that saw-tooth effect?

Put XACTLINE in the control circuit. XACTLINE anticipates the temperature changes—before they occur. And too, it nullifies the varying amounts of thermal lag, residual heat, and mechanical lag—producing a short on-off cycle resulting in "Straight-Line" temperature control. This performance is possible because there is no dependence upon mechanical parts—XACTLINE operates electrically.



Exact reproduction of temperature chart for a heating process showing the comparison of the "Straight-Line" temperature control produced by XACTLINE and the saw-tooth curve obtained with only conventional control.

XACTLINE is applicable to any indicating or recording pyrometer control of the millivoltmeter or potentiometer type. It should be used wherever close temperature control is required—any type of electrically heated oven, furnace, kiln, injection molding machine, and fuel-fired furnaces equipped with motor-operated or solenoid valves.

XACTLINE is a complete unit. No adjustment or coordination with the control instrument is required regardless of the size of the furnace, length of the heating cycle, or size of the load. Installation is very simple—can be either flush or surface mounted.

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FERROALLOYS

Ferromanganese

78-82% Mn. maximum contract base price, gross ton, lump size.
F.o.b. Niagara Falls, Alloy, W. Va., Welland, Ont., Ashtabula, O..... $185
F.o.b. Johnstown, Pa. $187
F.o.b. Sheridan, Pa. $185
F.o.b. Etna, Clairton, Pa. $188
$2.00 for each 1% above 82% Mn, penalty, $2.15 for each 1% below 78%.
Briquets—Cents per pound of briquet, delivered, 66% contained Mn.
Carload, bulk 10.95
Ton lots 12.55

Spiegeleisen

Contract prices gross ton, lump, f.o.b.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Palmerton, Pa.	$74.00	$75.00
Pgh. or Chicago	74.00	75.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.
96% min. Mn, 0.2% max. C. 1% max. Si, 2.5% max. Fe.
Carload, packed 34.75
Ton lots 36.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.
Carloads 28
Ton lots 30
Less ton lots 32

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50. Contract price, carloads, lump, bulk, delivered, per lb. of contained Mn .....19.15¢

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots..	2.40	3.30	4.55

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C. For 2% max. C, deduct 0.2¢.
Carload bulk 9.90
Ton lots 11.55
Briquet, contract basis carlots, bulk delivered, per lb of briquet 11.15
Ton lots 12.75

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $92.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $83.00. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.
96% Si, 2% Fe..... 21.70
97% Si, 1% Fe..... 22.10

Silicon Briquets

Contract price, cents per pound of briquet bulk, delivered, 40% Si, 2 lb Si briquets.
Carload, bulk 6.95
Ton lots 8.55

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump, bulk, carloads, delivered.

25% Si.....	20.00	75% Si.....	14.30
50% Si.....	12.40	85% Si.....	15.55
90-95% Si			17.50

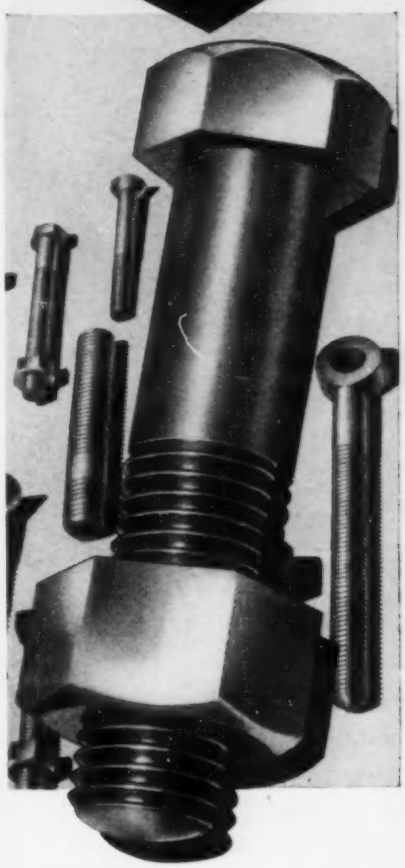
Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd, Mn 85-90%.

	Carloads	Ton	Less
0.7% max. C, 0.06% P, 90% Mn.....	26.25	28.10	29.30
0.07% max. C.....	25.75	27.60	28.80
0.15% max. C.....	25.25	27.10	28.30
0.30% max. C.....	24.75	26.60	27.80
0.50% max. C.....	24.25	26.10	27.30
0.75% max. C, 7.00% max. Si.....	21.25	23.10	24.30

For other ferroalloys see May 24 issue, p. 160.

First for **BOLTS NUTS STUDS**



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★ Monel Metal

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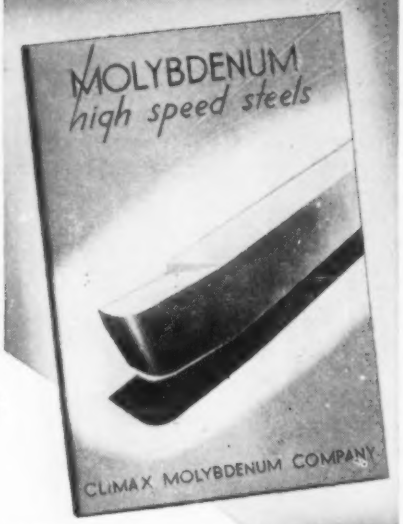

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Other Ferroalloys

Alsifer, 20%, Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.
Carload ..... 9.90¢
Ton lots ..... 11.30¢

Calcium molybdate, 45-40%, f.o.b. Langeloth, Pa., per pound contained Mo. $1.15

Ferrocolumbium, 50-60%, 2 in. x D, contract basis, delivered, per pound contained Cb.
Ton lots $4.90
Less ton lots 4.95

Ferro-Tantalum-columbium, 20% Ta, 40% Cb, 0.30 C. Contract basis, delivered, ton lots, 2 in. x D, per lb of contained Cb plus Ta $3.75

Ferromolybdenum, 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo. $1.32

Ferrophosphorus, electrolytic, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $3 unitage, per gross ton $65.00
10 tons to less carload 75.00

Ferrotitanium, 40%, regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa. freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25%, low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots 1.55

Ferrotitanium, 15 to 18%, high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton $177.00

Ferrotungsten, standard, lump or ¼ x down, packed, per pound contained W, 5 ton lots, delivered $5.00

Ferrovanadium, 35-55%, contract basis, delivered, per pound, contained V.
Openhearth ..... $3.00-$3.10
Crucible 3.10- 3.20
High speed steel (Primos) 3.20- 3.25

Molybdic oxide, briquets or cans, per lb contained Mo, f.o.b Langeloth, Pa. $1.14
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.13

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound
Carload, bulk lump ..... 14.50¢
Ton lots, bulk lump ..... 15.75¢
Less ton lots, lump ..... 16.25¢

Vanadium pentoxide, 86 to 89% V_2O_5 contract basis, per pound contained V_2O_5 ..... $1.28

Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.
Ton lots ..... 21.00¢

Zirconium, 12-15%, contract basis, lump, delivered, per lb of alloy.
Carload, bulk ..... 7.00¢

Boron Agents

Contract prices per lb of alloy, del.

Borosil, f.o.b. Philo, Ohio, freight allowed, B, 3-4%, Si, 40-45%, per lb contained B $5.25

Bortam, f.o.b. Niagara Falls
Ton lots, per pound ..... 45¢
Less ton lots, per pound ..... 50¢

Carbortam, Ti, 15-21%, B, 1-2%, Si, 2-4%, Al, 1-2%, C, 4.5-7.5%, f.o.b. Suspension Bridge, N. Y., freight allowed.
Ton lots, per pound..... 10.00¢

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D. Ton lots..... $1.20
F.o.b. Wash., Pa.; 100 lb up
10 to 14% B..... .85
14 to 19% B..... 1.20
19% min. B..... 1.50

Grainal, f.o.b Bridgeville, Pa., freight allowed, 100 lb and over.
No. 1 ..... $1.00
No. 6 ..... 68¢
No. 79 ..... 50¢

Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd
Ton lots $1.46
Less ton lots 1.57

Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered.
Less ton lots $1.80

Silcaz, contract basis, delivered.
Ton lots ..... 45.00¢

Winged Victory of Samothrace representing a winged Nike, who sweeps down with lightning speed; seeming to force a way for the imposing Goddess of Victory.

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made in this modern plant perform perfectly at lightning speed or at the speed of a snail's pace.

In this ball plant, where balls only (not bearings) are made, more and more manufacturers are discovering the uniform results in their finished product because of the exactness practiced here.

In this plant the equipment, machinery and instruments are mostly our own design. The personnel is above the average and well-trained. These facts visitors are quick to discern.

These are only a few reasons why Universal Precision Balls are used in increasing quantities by meticulous bearing manufacturers in the U. S. A. and abroad. Because of long years of study and careful research Universal Precision Balls are made to within ten millionths of an inch and as small as .020 of an inch.

For precision balls that reduce friction, wear and assembly costs to a minimum, specify Universal Precision Balls.

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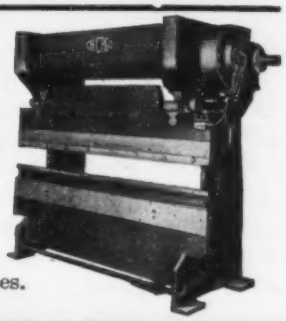

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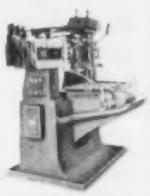

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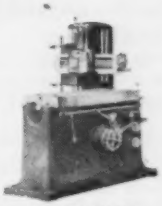
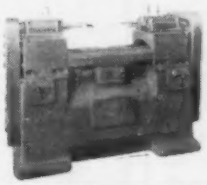
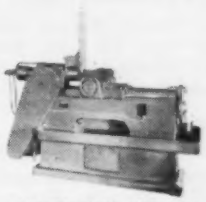


HYDRAULIC OPENSIDE PLANER



DOUBLE END PRECISION BORING MILL



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MILLERS, Aut. Form; Thread; Duplex Hob Thread; Hand; Shell Thread; Horizontal & Vertical; Cam Hydr.
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35' Southwark Pyramid Type Plate Bending Roll, 30" Diameter Top Roll, 20" Diameter Bottom Rolls, Drop End Air Actuated, Motor Driven

26' Southwark Pyramid Type Plate Bending Roll 24" Diameter Top Roll, 16" Diameter Bottom Rolls, Power Elevation of Top Roll. Elec. Equipment Included

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10 Ton Northern 55'8" Span, Three 230 Volt D.C. Motors, Floor Control, All latest refinements. Never used

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2" AJAX New Model Forging Machine Twin Gear Drive, Belted Motor Drive, With A.C. Motor and Starter, Overhung Suspended Header & Die Slides

FURNACES—MELTING

6 ton Heroult Electric Melting Furnace Side Door, Tilt Type. Transformer 2000 KVA Westinghouse 11,000 volt primary, 3 ph. 60 cy., 121-95 volt secondary

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Consisting of 2 tanks 50" dia. x 30" long, Capacity 3000 gal. each designed for 1500# pressure; Accumulator control; 4 Electrically driven hydraulic pumps 200 GPM @ 1500# psi with complete electrical equipment

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1000 ton United Steam Hydraulic Forging Press Complete with Accumulator, Intensifier, Tools and 8000 lb. Alliance Straight Line Floor Type Manipulator

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Babcock & Wilcox Size E32, Class 221-BA Pulverizer. Complete with Table Feeder, Pulverizer Fan, Elecl. Equipt. Capable of grinding 7525 lbs. coal per hr.

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23" x 60" Mackintosh Hemphill Three High Breakdown Mill, Cast Steel Housings, Motor Driven Screw Downs, Complete with Pinion Stand, etc.

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Model 2 BM Sutton Round Straightener. Capacity 1/2" O.D. to 4 1/2" O.D. Tubes. 1/2" Dia. to 4 1/2" Dia. Bars. Any Length. Complete with electrical equipment. Including 40 H.P. Main Drive Motor. One 1 H.P. and one 1/4 H.P. motor

TESTING MACHINES

300,000 lb. SOUTHWARK-EMERY Universal Hydraulic Testing Machine

WELDER

700 KVA Federal Flash Welder, Enclosed Rim Type, 440 Volt, Single Phase, Ring Sizes 6" to 35" Diameter x 12" Wide

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NEWS OF USED, REBUILT AND SURPLUS MACHINERY

Telling Argument — Recommendations of the used machinery committee are still being considered by OPS officials. Action on the new pricing order may come after July 3. General feeling is that the committee was able to put up a telling argument against pricing by weight and that OPS was impressed enough to either go back to the MDNA pricing by percentage or work out a compromise.

Pricing Order for New — Last week OPS was on the brink of issuing a special pricing order for new machine tools—finally listening to new tool builders who insistently maintained that pricing handicaps and materials shortages could put the defense program in a log jam.

Permitting new machine tool makers to tack on overtime and subcontracting costs to their base price will quicken production. Subcontracting is the only means with which these builders can add production capacity without going into expensive expansion programs that may prove flops later.

Another stimulus to output which new tool builders seemed to have won was a 30 pct cash advance on pool orders.

Effect on the Used—Since the new builders have been given an OPS tonic, some in the used field may fear that their business volume may slacken as a result on increased new tool production. Consensus of Washingtonians and men in metalworking is that enough defense business is materializing to keep both the new and used markets gasping for breath.

This vastly rising volume of defense work is filtering down more heavily to the lower industrial echelons. Small business must divert to defense or shut its gates because of metals shortages. As they get more deeply into defense work, they will be entering the used market more intensely. Good business seems assured.

New York Market—In the New York market volume of inquiries was not as weighty as before. The dip was not viewed as anything serious by the trade. The market nevertheless continued to see action. Some buyers who were hesitating before took the plunge.

Other buyers clambered out. Main reason for their withdrawal was the imminent pricing order on used machinery. They saw the possibility of saving a few dollars and waited.

In Special Demand—In particular demand in the New York market were late type vertical mills, production mills, and turret lathes. Power shears seemed to have slipped into scarcity for obvious reasons.

Metalworking plants are not getting custom-made sheet steel as in days of yore. They take what they can get nowadays, whether it be from mills or from ships coming from Europe. Power shears are needed to trim this odd-sized steel.

Pricing on Agenda — The New York Chapter, MDNA, met last Monday at Cavanagh's Restaurant. The meeting was more spirited than usual. Reason: on the agenda was the question of the new pricing order.

On the Auction Block—Today, Thursday, auctioneers of Industrial Plants Corp. will put the precision screw manufacturing plant of the Lucas Screw Products, Inc., Rochester, N. Y., on the block. The firm has made it known that it is not being forced out of business but is voluntarily retiring.

Timing of the retirement is wise. Prices for Lucas' automatic screw machines, Davenports, millers, grinders, and tappers are at peak. Industrial says many machines were new 1941 to 1945.

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ACCUMULATOR
Elmes Hydraulic Air Ballasted Accumulator 50 GPM @ 2000# Working Pressure

AIR COMPRESSOR
1218 cu. ft. Chicago Pneumatic 20" & 12"x14" Class O-CE. With 225 H.P. Westghse. Syn. Motor 2200/3/60

ANGLE BENDING ROLL
#0A Buffalo Angle Bending Roll, Motor Driven. Capacity 1¼x1½x3/16" Angles

BENDERS—PIPE
Series 100 Pines Bending Machine, Capacity 1" O.D. 16 Gauge Tubing
No. 500 Wallace Bending Machine, Capacity 1⅝"
100 ton Baldwin Southwark Hydraulic Pipe Bender, Comp. with Elecl. Equip. Discs for bending pipe 2¼" to 8" incl.

BENDING ROLLS
7'x¼" Webb Model R-3-L Initial Type, M.D.
8'x½" Pyramid Type Plate Bending Roll, M.D.
12'x¾" Cleveland Pyramid Type, Motor Driven
18'x¾" H & J Pyramid Type, Motor Driven
28'x⅜ Southwark Pyramid Type, Motor Driven
35'x¾" Southwark Pyramid Type, Motor Dr.

BOLT THREADING MACHINE
2" Landis Single Head Bolt Threading Machine. Belted Motor Drive. Equipt with Lead Screw

CRANES—OVERHEAD ELECTRIC TRAVELING

3½ ton Shaw Box	43' Span 230 Volt DC.
5 ton Robbins Myers	28'6" Span 220/3/60
10 ton Conco	39' Span 220/3/60
10 ton Northern	55'8" Span 230 Volt DC.
10 ton P & H	28'6" Span 110 Volt DC
10 ton P & H With 3 Ton Auxiliary Hoist	80' Span 230 Volt DC.
15 ton Case	40' Span 230 Volt DC.
15 ton Niles	60' Span 230 Volt DC.
30 ton Morgan	27'6" Span 230 Volt DC.
50 ton Northern With 10 ton Auxiliary Hoist	53' Span 440/25/3 AC.
75 ton Case	65' Span 230 Volt DC.
125 ton Shaw Box	65' Span 230 volt D.C.

CRANE TROLLEY
40 ton Shaw Box Crane Trolley with 15 H.P. G.E. Motor Totally Enclosed Ball Bearing 220/440/3/60: Center to center of rail 7' 6". NEW 1942

CRANE—GANTRY
Model 200 Colby Electric Powered Whirley Crane. Complete with elecl. equip. 440/3/60. Capacity 45 Ton @ 30' Radius to 10 Ton @ 89' Radius

DRAW BENCHES
840 ton Clearing Machine Co., Hydraulic Draw Bench Two Column Type with Double Action Piston, Stroke of Slide 200"
30,000 lb. Draw Bench with Speed Reducer & Motor Maximum Draw Approx. 52 ft.

DRILL—RADIAL
10' Cincinnati Bickford Radial Drill, 24" Dia. Column, No. 6 Morse Taper, Elecl. Equip. Incl.

EYE BENDER
William White, Capacity 1½" Round stock bent hot, ¾" Round stock bent cold

FLANGING MACHINE
½" McCabe Pneumatic Flanging Machine

FORGING MACHINES
1½", 2", 2½", 3½", 4", 5" Ajax
2" Ajax, Motor Driven—Air Clutch—New 1941
2", 5" National
2", 5" Acme

FOUNDRY EQUIPMENT
Model BM53640 American Multi-Tumblast, With 10 Ft. Main Table and four 4 Ft. Auxiliary Tables
48"x72" W W Sly Tumbling Barrel, Motor Driven
Model No. 6 Standard 66" Diameter Shell Cupola Complete with Blower & Foxboro Air Weight Control

FURNACES—ANNEALING
Gas Fired Wire Coil Annealing Furnace Chamber Approximately 36" x 36"
35 KW Electric Wire Annealing Furnace Continuous Tube Type Muffle 5' 11" Long, Cooler 4'2" Long
70 KW Electric Wire Annealing Furnace Continuous Tube Type 9' 5¾" Long with Cooler 8' Long
200 KW Continuous Electric Bright Annealing Furnace Heating Chamber 4'6" x 30' Long. Cooling Chamber 44' Long in two parts
Surface Combustion Radiant Tube Annealing Furnace. For bright annealing copper tubing, Hearth-heating zone 30' long 3' wide

FURNACES—HEAT TREATING
Electric Furnace Co. Rotary Furnace Hearth 31' Dia., 3' wide, Sq. Ft. Hearth Area 436
Chamber 20' Long, Cooling Chamber 18' Long
200 KW Westinghouse Roller Hearth Furnace Heating Chamber 20' Long, Cooling Chamber 18' Long
275 KW Westinghouse Roller Hearth Furnace Heating Chamber 12' Inside Length, 54" Inside Width

FURNACES—MELTING
2 Ton Heroult Nose Tilt Type Melting Furnace
3 Ton Heroult Rocker Tilt Type Melting Furnace
6 Ton Heroult Tilt Type Melting Furnace, With 2000 KVA Westinghouse Transformer 11,000/3/60

GEAR REDUCERS
800 H.P. Falk Single Herringbone Reducer Ratio 9:15-1
1200 H.P. Mesta Double Reduction Gear, Ratio 20.52:1
600 H.P. Westinghouse Reduction Unit Ratio 3:76-1
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HAMMERS—BOARD DROP
500, 1200, 1600, 2000, 2500 lb. Chambersburg
400, 600, 1000, 1200, 1600 lb. Billings & Spencer

HAMMER—ROPE DROP
42" x 62" 3 ton Rope Drop Hammer, Incl. two 15 H.P. A.C. Motors

HAMMERS—STEAM DROP
1000 lb. Chambersburg
1500, 2000 lb. Erie

HAMMERS—STEAM FORGING
800, 1100, 1200, 1500, 2000, 4000, 6000, 8000 lb. Chambersburg
600, 1000, 1500, 2500 lb. N.B.P.
800, 1100, 3500, 12,000 lb. Erie

HAMMERS—MISCELLANEOUS
No. 2B Nazel Hammer, Motor Driven
500 lb. Beaudry Hammer, Motor Driven
1000# Chambersburg Pneumatic Motor Driven Forging Hammer, Complete with Motor

LATHE
36" x 17' Bridgeford Geared Head Lathe Quick Change Gears, Motor Driven

LEVELER—ROLLER
78" McKay Roller Leveler, 17 Rolls 2½" Dia.

LEVELER—STRETCHER
Model 1196 Torrington Hydraulic Stretching Machine Capacity Sheets 14' long x 5' Wide, Complete with Pump and Motor

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1000 KW Westinghouse Generator 250 Volt D.C. with 1440 H.P. Westinghouse Synchronous Motor 2300 volt 25 cycle 3 phase
1800 KW General Electric Generator 250 Volt D.C. With 2500 H.P. G.E. Motor 2300/3/60

NAIL MAKING MACHINES
No. 2 Glader Sizes 6D, 7D, 8D, 9D Angle nail sizes 10D, 12D, 16D, roofing

PIPE MACHINES
No. 304 Oster Pipe Threading & Cutting Machine Capacity 1" to 4" LATE
No. 8 Oster "Rapiduction" Pipe Cutting Machine Capacity 2½" to 8" LATE
Eaton-Cole & Burnham Pipe Threading & Cutting Machine, Capacity 6" to 12"

PLANERS
32x35"x10' Niles One Rail Head
66x48"x16' Cincinnati, Three Head, Motor Driven
84x72"x33' Niles-Bement-Pond, Four Head
72x72"x16' Detrick & Harvey, Four Head, M.D.
72x72"x24' Betts, Four Head, M.D.
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PLANERS—OPEN SIDE
48x60"x22' Cleveland, Three Head
60x60"x16' Detrick & Harvey, Three Head

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Medart Type Bar Pointer, Capacity ½" to 2" Rd.

PRESS—EMBOSSING & COINING
Bliss #26-A 800 ton Double Geared Knuckle Joint Press. With 8 Station Dial Feed

PRESSES—HYDRAULIC
75 ton Williams White Straightening Press, 27" Stroke, Bed 8' x 16", 6½" Dia. Ram
300 ton Erie Steam Platen Press, 22" Stroke, Bed Area 30" x 60"
500 ton Southwark Open Throat Hydraulic Press, 12" Stroke, Platen 56" x 56"
1000 ton United Steam Hydraulic Forging Press Davey Pat. Quick Acting. Distance between columns 7' x 2'9" Stroke of Ram 48"

PRESS—HYDRAULIC WHEEL
100 ton Caldwell Hydr. Wheel Press, 36" Between Parallel bars

PRESS—STRAIGHT SIDE
No. 620 Bliss High Production Press Flywheel Type 1½" Stroke. Face of Slide 8" x 16½"

PRESS—TOGGLE DRAWING
No. 14B Bliss Toggle Drawing Press, 53" Between Uprights. 24" Stroke of Blankholder, 28" Stroke of Plunger

PRESSES—TRIMMING
No. 8 Erie Flywheel Drive Trimming Press. 3¾" Stroke. 13" Between Guides
100 ton Chambersburg Hydraulic Trimming Press 18" Stroke, 36" Between Uprights
No. 306½ Bliss, 3" Stroke—New 1943. Equipped with Side Shear

PUNCH—BEAM
Long & Allstatter Double End Beam Punch. Capacity Beam Punch End—Punch flanges and web 24" I-beam and smaller

PUNCH & SHEAR COMBINATIONS
No. 1½ Buffalo Universal Ironworker, M.D. Built-in Coper & Notcher, Capacity Punch ⅝" x ⅞", Shear 1⅞" Round, 1¾" Square
No. 4½ Hilles & Jones Single End Punch, 60" Throat Capacity 1¼" thru 1", Architectural Jaw
No. 4 Hilles & Jones Single End Punch, 48" Throat Capacity Punch 1⅛" thru 1"
Long & Allstatter Single End Punch, 60" Throat Capacity Punch 1⅝" thru 1"

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50 ton Hanna Pneumatic Yoke Riveter, 102" Throat 21" Gap
125 ton Hanna Bull Riveter, 75" Reach, 24" Gap
150 ton Chambersburg Hydraulic Gap Riveter

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Stameo Corrugating Roll, Designed for 1¼", Corrugations 48" Wide, 28 Gauge Capacity

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10" Breakdown Mill Single Stand (Three High)
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51" Plate Straightening Roll, 7 Rolls 10" Dia.
84" Plate Straightening Roll, 7 Rolls 13" Dia.
110" x ½" Niles Plate Straightening Roll

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62" Newton Type U-87-B Hydraulic Cold Saw 62" Dia. Blade. Capacity 20" Round, 18½" Square, Complete with Elecl. Equip.
No. 4 Motch & Merryweather Hydraulic Cold Saw Complete with Elecl. Equip. Late Model
No. 3 Motch & Merryweather Cold Saw Capacity 10⅝" Rounds

SHEAR—ALLIGATOR
No. 7 Carlin Left Hand Low Knife Alligator Shear Motor Driven. Capacity 3" Square

SHEARS—ANGLE
Long & Allstatter Double Angle Shear, Model B, Capacity 6x6x¾", Complete with Elecl. Equip.
No. 5 Cleveland Double Angle Shear 8x8x1" Mounted on Turntable, Geared Motor Drive

SHEAR—BAR
No. 2 LH Lewis Open End Bar Shear, Motor Drive, Capacity 1½" Round

SHEAR—GATE
6' x ¾" Long & Allstatter Gate Shear, Motor Driven, 36" Throat

SHEARS—ROTARY
No. 60 Quickwork Rotary Shear, ¾" Capacity
No. 100 Kling Rotary Shear, 1" Capacity

SHEAR—SQUARING
6' x 3/16" Bliss Squaring Shear, Motor Dr.

SLITTER
72" Yoder Gang Slitter, Capacity 5 Cuts 20 Ga.

STRAIGHTENERS
Sutton Single Cross Roll Straightener, Motor Driven Capacity ¾" to 1¼" Tubes or Bars, Timken Roller Bear., Complete with Pump and Motors
No. 1 Sutton, Capacity up to 1½" Diameter
Model 2BM Sutton Round Straightener, Motor Dr. Capacity ⅜" to 4" Tube, to 3½" Bars O.D.

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No. 00 Torrington, Capacity 5/16"
No. 3A Standard, Capacity ⅜" Solid 1¾" Tube
No. E4 Langelier, Capacity 1½" Tubing
No. 408 Etna Swager, Capacity 4" Tubing, Length of Dies 8"

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25,000 Gal. Water Tank 15' Diameter, With supporting tower and piping

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20,000# Southwark Model S10C Hydr. Universal
120,000# Baldwin-Tate-Emery Universal Hydr.
300,000# Southwark Emery Universal Hydraulic

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1500 KVA Westinghouse Transformer, 66,000 volt Primary, 480 volt Secondary, 60 cycle
2000 KVA Allis Chalmers Transformer, 33,000 Volt Primary, 13 200/6 600 Volt Secondary, Single phase 60 cycle
7500 KVA General Electric 33,000 to 13,800 volts, 3 phase, 60 cycle

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90 KW Sciaky Electric Resistance Spot Welding Machine 34" Throat, Capacity 2 thicknesses, .032" to .125" aluminum, Including rectifier 440 volt 3 phase, 60 cycle
150 KVA Federal P2-12A Press Type Spot Welder 440 volt single phase 60 cycle
Taylor Winfield Press Type Spot Welder, Type HWRD-36-3 HI-WAVE
700 KVA Federal Flash Welder, Enclosed Rim Type Ring Size 6" to 35" Dia. x 12" Wide, 440 Volts Single Phase

WIRE MACHINERY
No. 22 U. S. Multi-Slide, Motor Driven, Max. Length of Stock Feed 4½"
20 Draft Superior Wire Drawing Machine, Capacity Wire 18 Ga. to .011" Motor Dr. Spooling Attachment. Wire Pointer. Wire Puller incl. NEW 1946

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18" x 48" centers Monarch Shapemaster with Keller attachment. Manufactured in 1946 and practically new in condition.

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10 to 66" stroke Cincinnati single ram with receding table. Serial No. 3E3VIU-3, new in 1948.

DRILL OR BORER

No. 30 HO Baker two spindle inverted, hydraulic feed. Serial No. 12081, new in 1942.

DEEP HOLE DRILL

15" No. 2 Avey 4 spindle with motor spindles. Hydraulic woodpecker feed to each spindle. Serial No. 16357.

UNIVERSAL GRINDER

14" x 36" Landis hydraulic, Serial No. 28269, new 1943 or 1944. Has internal attachment, 3 back rests, one steady rest.

BLANCHARD GRINDERS

Two No. 16A2 two spindle machines with 15 HP motors on each spindle, plain table 45" OD, 24" ID. Serial Nos. 2476 and 2781.

KEYSEATER

3" x 24", No. 5 Mitts & Merrill "Giant" with 5 HP AC motor, power feed and large lot of equipment.

LAPPERS

No. 26 Norton Hyprolap, Serial No. LV-1549.

No. 2F Norton hand lap, 36" discs.

30", No. 86 Gardner hand lap.

LATHE

40" x 84" centers Leblond heavy duty, Serial No. NK574, new in 1943. Has pan bed and pump, taper attachment, chuck, etc.

LATHE

20" x 84" centers Leblond Rapid Production, Serial No. 20RP299, new in 1943. Has taper attachment, pan bed and pump, chuck, etc.

BORING MILL

100" Niles Bement Pond Heavy Pattern with two swivel heads on rail and power rapid traverse, 3 HP DC motor and control.

BORING MILL

5" bar, Jones planer table type. 42" x 110" table. Serial No. 1590D. Rebuilt and ready to ship.

THREAD MILLER

Model CT36 Lees Bradner, Serial No. CT141, new in 1941. Has 13" hole thru spindle.

UPSETTER

2" National, Serial No. 13213 with overarm guide on ram, suspended slides, motor drive. Rebuilt and ready to ship.

UPSETTER

4" Ajax, Serial No. 3156 with suspended slides, twin drive gears, self contained backshaft, motor drive.

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SAGINAW, MICH.

DG-57 Ferracute S. S. Tie Rod Roller Bearing Press, Stroke 12"; new 1945; used 60 days

Buffalo 27-U Ironworker, Punch 1⅜" thru 1"; shear 6x6x¾" angles; throat 30"

W. W. Plate Shear, 4'1"

Ajax Upsetting & Forg. Machs. twin gears, twin flywheels, susp. slides 2, 2½, 3, 4"

National Upsetting & Forg. Machs. guided overarm heading slide 1½, 2, 3"

Ajax and Acme Upsetting & Forg. Machs. not susp. slides ¾, 1, 1½, 2½, 3"

3" Ajax single stroke solid die ball header, rated cap. 4½" balls; susp. slides, air clutch

W. W. Bulldozers #2, 3, 5; #3 & #4 High Speed

Drop Hammers, various caps.

Nazel Air Forg. Hammer #6-B, cap. 7" sq.

Nazel Air Forg. Hammers #3-B, #4-B

Bradley Hammers, Cushioned Helve, Upright & Compact up to 500#

Bar Shears, Open & Guillotine ⅝ to 4", also including VF-50 Pels

#94-A Toledo S. S. Double Crank Tie Rod Press; bolster 40x36"

W. F. Knuckle Joint Press, 200-ton; 6" stroke

EG-54 Ferracute Knuckle Joint Press 400-ton

600-ton Chambersburg Duplex Hi-Speed Hydr. Wheel Press 54" betw. bars.

600-ton R. D. Wood Inclined Hydr. Locomotive Wheel Press; 96" betw. bars

#50-A Quickwork Whiting Rot. Shear ¾"

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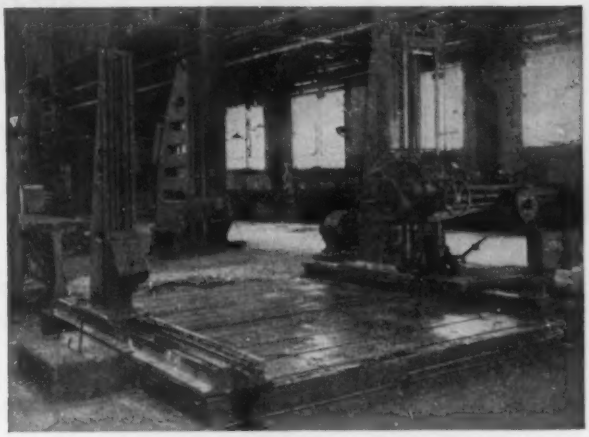

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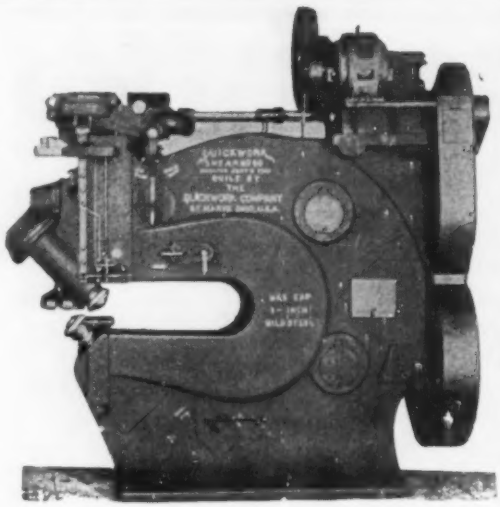

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1	10	Shaw Box	40'-0"	220/440 VAC
1	10	Alliance (2-5 ton trolleys)	47'-0"	230 VDC
1	10/3	Whiting	75'-0"	230 VDC
1	35	Case	50'-0"	220 VAC
1	40/10	Toledo	87'-6"	230 VDC

SQUIRREL CAGE MOTORS
3-Phase, 60-Cycle

Qu.	H.P.	Make	Type	Volts	R.P.M.
1	400	G.E.	IK	2200	514
1	400	G.E.	KT-412	2200	435
3	500	Whse.	CS-899	2300	1750
1	250	Whse.	CS	2200	1160
1	200	Al-Ch.	AR	440/220	580
3	125	Al-Ch.	AR	2200	1750
1	125	Whse.	CS-761C	440/220	1750
1	125	C.W.	126-Q	440/220	430
2	100	Whse.	CS-663C	440/220	1750
1	100	G.E.	IK	440/220	1800
1	100	Al-Ch.	AR	2200	1160
1	100	Al-Ch.	AR	550	690
1	100	F.M.	H241B	440/220	435
1	100	Whse.	CS-938	2200	495
1	75	G.E.	I-K15	440/220	570
1	75	Al-Ch.	AR	2200	1765
1	75	Al-Ch.	AR	2200	690

CRANE & MILL MOTORS
230 VDC

Qu.	H.P.	Make	Type	R.P.M.
1	150/200	Whse.	MCB 100	270/300
1	150/200	Whse.	MCSA 181	450/400
1	100/140	Whse.	MCB 90	500/415
2	100/140	G.E.	MDA 108	500/430
2	100	G.E.	CD 1831	675
1	75	G.E.	CO 1812	450
6	65/85	G.E.	CO 1811	600/550
1	60/75	Whse.	K-10	425/470
3	50/65	G.E.	CO 1830	700/525
1	50/75	C.W.	F.W.	475/570
4	50	G.E.	CO 1810	725
1	50	G.E.	CO 2007	540
4	45/57	Whse.	K-8	470/515
1	40/50	G.E.	MDB 105	550/475
1	40/30	G.E.	MDP 410	495/575
3	35/50	G.E.	CO 1808	650/750
1	30/30	G.E.	MDA 104	575/725
1	30/25	G.E.	CO 1808	550/600
4	19/15	Whse.	K-5	550/680
1	19	C.W.	BWS 15	560
2	16/19	C.W.	BW	620/560
11	16/13	G.E.	MDS 406	615/700
2	15/19	G.E.	CO 1807	650/575
2	15	G.E.	CO 1825	1000
3	10/13.5	G.E.	MD 404	800/700
3	10/13.5	Whse.	MC 41	725/610
1	10	G.E.	MD 412	300/1200
1	11/13	C.W.	A2W	1050/910
2	8/9¾	C.W.	AW	695/635
2	10/7	G.E.	MDB 102	800/1025
1	9/12	G.E.	MDA 103	875/725
2	7½/10	C.W.	SWS 7½	800/675
2	6/7½	Whse.	MCA 20	600/700
4	7½/10	G.E.	CO 1824	750/600
2	6½/9	C.W.	AW	750/570
1	5/6.5	C.W.	SWS 5	1050/925
2	5/6.5	G.E.	MDA 402	1025/925
1	5	G.E.	CO 1804	725
2	5/4	G.E.	MDB 101	825/975
1	5/4	G.E.	MDA 101	825/975
1	3/3-3/4	G.E.	CO 1803	875/700

SYNCHRONOUS MOTORS
3-Phase, 60-Cycle

Qu.	H.P.	Make	P.F.	Volts	R.P.M.
1	3000	Whse.	80	4800/2400	720
1	700	G.E.	80	2300	720
1	600	Whse.	80	2400	720
1	400	Whse.	80	440	600
1	268	Al. Ch.	100	2200	900
1	150	G.E.	100	2200	900
1	150	G.E.	100	550/2200	600
1	150	G.E.	80	550/2200	450
3	125	El. Mchy.	100	4800/2400	900
1	125	G.E.	80	2200	900
2	100	Whse.	80	440/220	1800
1	100	Whse.	100	2300	1200
1	100	Ideal	80	220/440	900
2	100	G.E.	80	220/440	600
1	60	G.E.	80	220/440	1200
2	50	G.E.	80	2300	600

MOTOR GENERATOR SETS

Qu.	K.W.	Make	RPM	Volts DC	Volts AC
1	2400 (SU)	Al. Ch.	720	525	4800/2400
1	1500	Whse.	514	250	4800/2300
2	1000	G.E.	514	575	4000/2300
2	800	C.W.	720	575	4000/2300
1	500	C.W.	720	250/275	4000/2300
1	500	C.W.	720	250/275	2300/440
1	350	G.E.	720	250	2300/440
1	200	Ridgway	900	250	2300
1	155	G.E.	720	250	2300/440
1	150	Al. Ch.	1200	250	2300/440
1	150	G.E.	1200	500	2300/440
1	100	Ridgway	1200	275	4000/2300
1	85	C.W.	1200	250	2300/440
1	75	Star	1200	230	440/230
1	75	Al. Ch.	900	250	2300
1	50	Burke	1800	240	440/220
1	25	Whse.	1200	120/240	440/220

34—3-Unit St.

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Qu.	K.V.A.	Make	Type	Phase	Voltage
1	7500	G.E.	H	3	33000/29700 13800/12600
1	4500	G.E.	HT	3	27000/24300-2300
3	1500 (new)	Gregory	(X)	3	4160-480
3	750 (new)	Gregory	(X)	3	4160-480
3	250	Packard	OISC	1	13200-2200
3	100	Whse.	SS	1	12075/10955-230/460
3	100 (new)	G.E.	HS	1	14400/12870-240/480
3	50	Al. Ch.	OISC	1	22000-220
2	50	Wagner	HH	1	13200/11880-575/287

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1	1750	Whse.		600	550/700
1	1500	Whse.		525	600
2	1000	Whse.		450	600
1	940	Whse.	QM	250	140/170
1	650	G. E.	MPC	250	115/145
1	600	Al. Ch.		250	400/800
1	500	Whse.		230	300/600
1	350	Cr. Wh.	CCM-151H	230	1100
1	335	Whse.	MQ	250	300/900
1	200/300	G. E.	MPC	230	360/920
1	275	Whse.	QM	230	425/850
1	250	G. E.	MPC	230	400/500
1	150	G. E.		600	250/750
1	150	Cr. Wh.	65H	230	1150
10	150	Cr. Wh.	83H-TEFC	230	960
1	150	G. E.	MPC	230	250/450
1	100	Rel.	1050T	230	400/1200
1	100	G. E.	CD-175	230	365/730
1	100/150	Whse.	SK-200	550	600
1	125	El. Dy.	308	230	750/1500
1	115	Cr. Wh.	JHL	230	1200
1	80/100	G. E.	MPC	230	225/450
3	100	Whse.	SK-184.5	230	475/950
1	100	G. E.	CDP-115	230	1750
2	92	Whse.	SK-173	230	575/1150
1	90	G. E.	CDM-1242-Z	115	1800
1	75	Whse.	SK-133	230	1750
1	75	Whse.	SK-180L	115	650
2	75	G. E.	CDM-1126-Y	230	2000
1	75	Cr. Wh.	CMC-65H	230	500/1500
1	60	El. Dy.	258	230	525/1050
1	60	Whse.	SK	230	500/1000
1	60	Whse.	SK-130	230	1600
1	50	Cr. Wh.	CCM	230	1750
1	50	El. Dy.	508	500	194/775
1	50	Cr. Wh.	CMC-80H	230	380/750
1	15/50	Cr. Wh.	CMC-81H	230	300/900
1	50	Whse.	SK-118	230	1750
2	50	G. E.	RCP-81B	230	1750
6	25/30	G E.	CD-105	230	690/2070

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2	125	G. E.	CO-1832	230	825
2	60	Whse.	Hoist	230	415
2	50	Whse.	Hoist	230	415
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20 ton Whitcomb Diesel Mech. 36" ga.
12 ton Plymouth gas 36" ga.
12 ton Plymouth gas std. ga.
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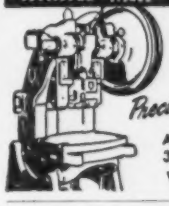

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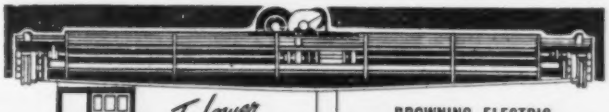

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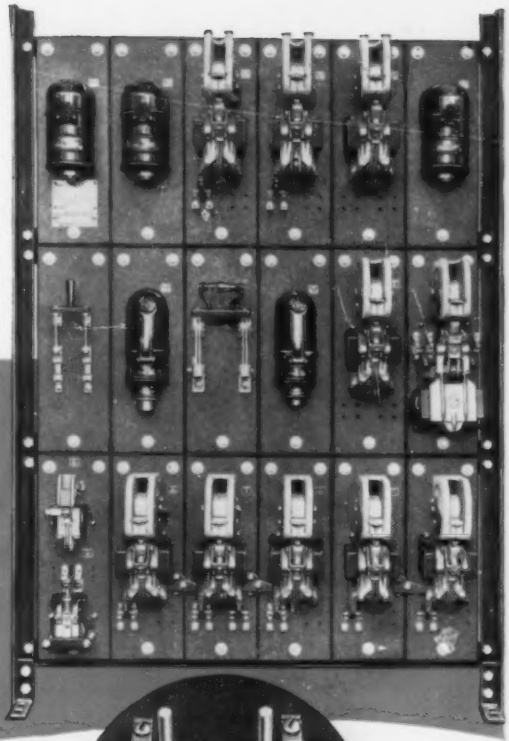

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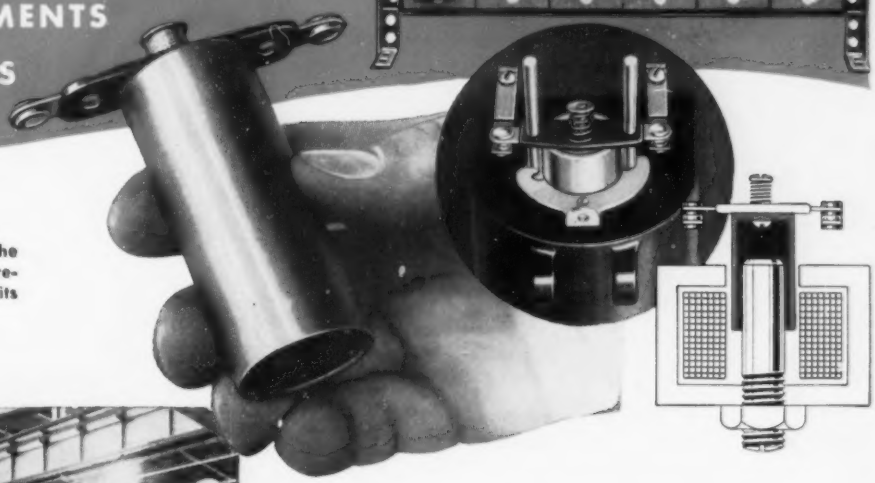

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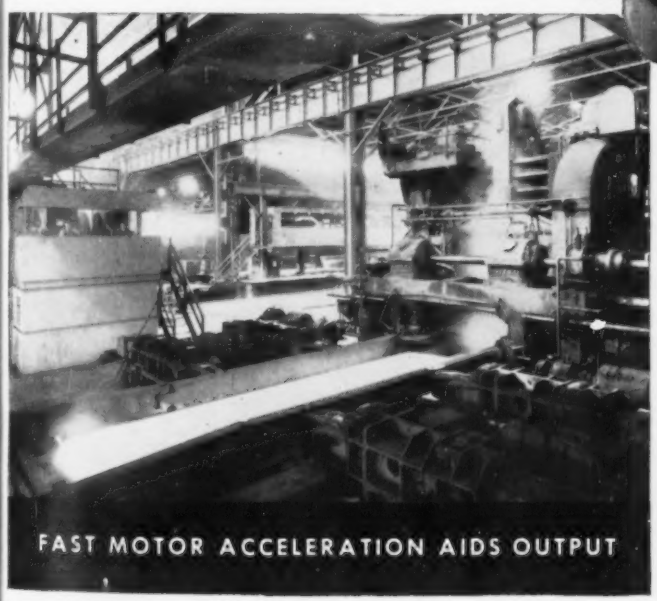

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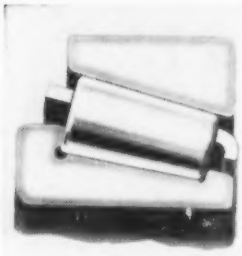

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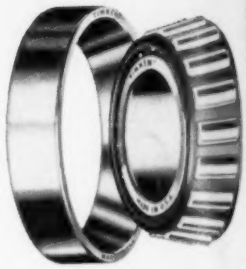

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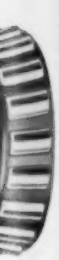
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